Vol. 1123 Number 4

OFFICIAL GAZETTE

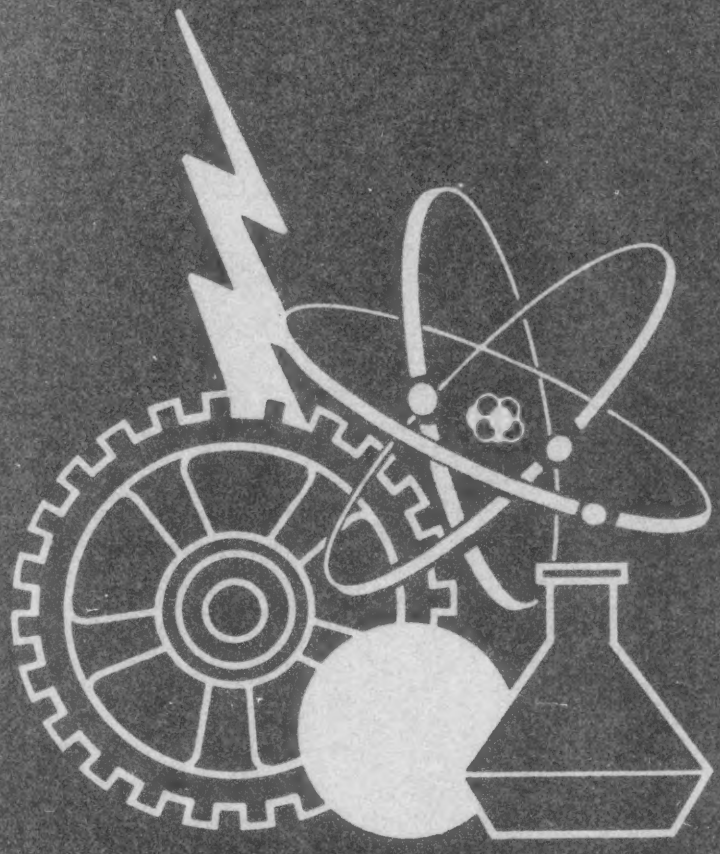
of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

February 26, 1991



PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

February 26, 1991 Volume 1123 Number 4

CONTENTS

	Page
Patent and Trademark Office Notices	
Patent Cooperation Treaty (PCT) Information	1123 OG 44
Notice of Maintenance Fees Payable	1123 OG 44
Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees	1123 OG 45
Reissue Applications Filed	1123 OG 47
Requests for Reexaminations Filed	1123 OG 48
Errata	1123 OG 48
Registration to Practice	1123 OG 48
Status of PTO Services	1123 OG 53
Patent Certificates of Correction	1123 OG 54
Special Boxes for Mail	1123 OG 55
Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries	1123 OG 56
Patent Examining Corps	1123 OG 58
Notice for the Official Gazette	1123 OG 59
Reissue Patents Granted (33,242)	2035
Plant Patents Granted (7,454)	2037
Patents Granted	
General and Mechanical (4,995,114)	2039
Chemical (4,995,884)	2299
Electrical (4,996,391)	2443
Design Patents Granted (314,853)	2555
Index of Patentees	PI 1
Indices of Reissue, Reexamination, Design and Plant	PI 68
Classification of	
Patents (Including Reissues, and Reexaminations)	PI 75
Designs, and Plants Applications	PI 78
Geographical Index of Residence of Inventors	
Patents (Including Reissues and Reexaminations)	PI 79
Designs and Plant Applications	PI 80
Change of Address Form and Subscription Order Form	PI 81

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1120 O.G. 14 on Nov. 27, 1990.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17,1990.

The search fee of the European Patent Office was changed due to a difference in the amount of the fee in German Marks and the exchange rate of the U.S. dollar in relation to the German Mark as of Jan. 3, 1991, and was announced in the *Official Gazette* at 1122 O.G. 566 on Jan 1, 1991.

International fees were changed on September 1, 1990 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1116 O.G. 32 on July 17, 1990.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1492.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	502.00
Basic Supplemental fee (for each page over 30)	10.00
Designation fee per country or region for the first 10 national or regional offices	122.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	154.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

Dec. 6, 1990

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on February 23, 1988 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,726,074 through 4,727,601
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on February 21, 1984 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,432,099 through 4,433,438
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), and (f), as amended Nov. 5, 1990, which are reproduced below:

37 CFR § 1.20 Post-issuance fees and surcharges

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$415.00
By other than a small entity.....$850.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$835.00
By other than a small enttity.....$1670.00"

The amounts of the surcharges for paying the maintenance fee during the grace period or after the expiration of the patent are set forth in 37 CFR 1.20(k), (l) and (m), which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED DECEMBER 16, 1990 DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,363,140	06/287,251	12/14/82
4,363,148	06/234,112	12/14/82
4,363,149	06/231,761	12/14/82
4,363,151	06/244,074	12/14/82
4,363,154	06/263,695	12/14/82
4,363,178	06/272,812	12/14/82
4,363,182	06/271,417	12/14/82
4,363,187	06/304,617	12/14/82
4,363,194	06/238,443	12/14/82
4,363,210	06/271,224	12/14/82
4,363,220	06/305,689	12/14/82
4,363,221	06/234,820	12/14/82
4,363,243	06/259,565	12/14/82
4,363,250	06/250,028	12/14/82
4,363,265	06/268,004	12/14/82
4,363,267	06/220,900	12/14/82
4,363,283	06/233,719	12/14/82
4,363,301	06/234,326	12/14/82
4,363,304	06/268,826	12/14/82
4,363,310	06/234,637	12/14/82
4,363,311	06/297,153	12/14/82
4,363,314	06/216,658	12/14/82
4,363,318	06/288,393	12/14/82
4,363,325	06/226,304	12/14/82
4,363,331	06/297,447	12/14/82
4,363,334	06/287,787	12/14/82
4,363,337	06/252,074	12/14/82
4,363,340	06/263,474	12/14/82
4,363,360	06/225,301	12/14/82
4,363,382	06/221,262	12/14/82
4,363,385	06/232,489	12/14/82
4,363,391	06/273,464	12/14/82
4,363,408	06/223,161	12/14/82
4,363,419	06/300,052	12/14/82
4,363,420	06/229,896	12/14/82
4,363,422	06/248,556	12/14/82
4,363,440	06/231,964	12/14/82
4,363,470	06/326,733	12/14/82
4,363,474	06/258,610	12/14/82
4,363,482	06/233,461	12/14/82
4,363,527	06/220,863	12/14/82
4,363,561	06/245,713	12/14/82
4,363,600	06/251,070	12/14/82
4,363,612	06/314,508	12/14/82
4,363,615	06/307,253	12/14/82
4,363,617	06/284,352	12/14/82
4,363,628	06/271,796	12/14/82
4,363,636	06/311,642	12/14/82
4,363,641	06/279,704	12/14/82
4,363,676	06/297,262	12/14/82
4,363,705	06/284,052	12/14/82
4,363,708	06/263,909	12/14/82
4,363,710	06/316,797	12/14/82
4,363,713	06/226,512	12/14/82
4,363,726	06/267,635	12/14/82
4,363,736	06/239,073	12/14/82
4,363,747	06/273,731	12/14/82
4,363,750	06/223,073	12/14/82
4,363,754	06/317,017	12/14/82
4,363,771	06/276,779	12/14/82
4,363,781	06/246,936	12/14/82
4,363,784	06/257,552	12/14/82
4,363,791	06/260,308	12/14/82
4,363,816	06/344,172	12/14/82
4,363,817	06/296,857	12/14/82
4,363,833	06/247,140	12/14/82
4,363,839	06/242,392	12/14/82
4,363,856	06/243,616	12/14/82
4,363,587	06/311,921	12/14/82
4,363,860	06/271,223	12/14/82
4,363,869	06/312,616	12/14/82
4,363,893	06/287,528	12/14/82
4,363,911	06/298,935	12/14/82
4,363,920	06/266,965	12/14/82
4,363,921	06/253,276	12/14/82
4,363,922	06/273,605	12/14/82
4,363,931	06/239,192	12/14/82
4,363,932	06/275,936	12/14/82
4,363,940	06/243,619	12/14/82
4,363,942	06/232,315	12/14/82
4,363,943	06/314,272	12/14/82
4,363,958	06/228,552	12/14/82
4,363,975	06/264,068	12/14/82
4,363,981	06/259,388	12/14/82

Patent Number	Serial Number	Issue Date
4,364,022	06/309,342	12/14/82
4,364,037	06/274,036	12/14/82
4,364,045	06/240,107	12/14/82
4,364,061	06/235,184	12/14/82
4,364,069	06/260,113	12/14/82
4,364,106	06/229,420	12/14/82
4,628,544	06/724,772	12/16/86
4,628,547	06/754,246	12/16/86
4,628,562	06/608,215	12/16/86
4,628,563	06/733,897	12/16/86
4,628,592	06/848,837	12/16/86
4,628,603	06/714,200	12/16/86
4,628,604	06/703,223	12/16/86
4,628,610	06/832,953	12/16/86
4,628,625	06/819,616	12/16/86
4,628,626	06/630,539	12/16/86
4,628,633	06/705,428	12/16/86
4,628,642	06/719,496	12/16/86
4,628,648	06/683,362	12/16/86
4,628,654	06/533,761	12/16/86
4,628,655	06/678,714	12/16/86
4,628,656	06/725,941	12/16/86
4,628,665	06/707,227	12/16/86
4,628,667	06/235,946	12/16/86
4,628,674	06/800,811	12/16/86
4,628,678	06/780,091	12/16/86
4,628,681	06/794,169	12/16/86
4,628,682	06/627,541	12/16/86
4,628,684	06/540,824	12/16/86
4,628,685	06/714,920	12/16/86
4,628,687	06/610,509	12/16/86
4,628,692	06/839,141	12/16/86
4,628,706	06/769,866	12/16/86
4,628,709	06/712,930	12/16/86
4,628,718	06/830,260	12/16/86
4,628,721	06/753,327	12/16/86
4,628,723	06/751,206	12/16/86
4,628,724	06/551,980	12/16/86
4,628,729	06/752,886	12/16/86
4,628,739	06/717,240	12/16/86
4,628,747	06/663,665	12/16/86
4,628,762	06/474,596	12/16/86
4,628,763	06/590,873	12/16/86
4,628,764	06/774,480	12/16/86
4,628,778	06/833,533	12/16/86
4,628,790	06/771,971	12/16/86
4,628,791	06/774,157	12/16/86
4,628,794	06/705,756	12/16/86
4,628,812	06/662,513	12/16/86
4,628,815	06/754,553	12/16/86
4,628,820	06/750,497	12/16/86
4,628,821	06/752,275	12/16/86
4,628,823	06/617,216	12/16/86
4,628,827	06/605,232	12/16/86
4,628,836	06/644,312	12/16/86
4,628,849	06/596,502	12/16/86
4,628,858	06/710,087	12/16/86
4,628,873	06/749,061	12/16/86
4,628,892	06/702,882	12/16/86
4,628,898	06/762,266	12/16/86
4,628,902	06/740,880	12/16/86
4,628,904	06/282,041	12/16/86
4,628,921	06/656,926	12/16/86
4,628,927	06/837,423	12/16/86
4,628,928	06/684,841	12/16/86
4,628,929	06/766,878	12/16/86
4,628,930	06/790,936	12/16/86
4,628,937	06/637,159	12/16/86
4,628,942	06/659,823	12/16/86
4,628,949	06/733,793	12/16/86
4,628,954	06/717,317	12/16/86
4,628,956	06/797,444	12/16/86
4,628,957	06/675,332	12/16/86
4,628,958	06/760,497	12/16/86
4,628,964	06/731,996	12/16/86
4,628,971	06/688,019	12/16/86
4,628,974	06/589,542	12/16/86
4,628,983	06/695,941	12/16/86
4,628,985	06/679,133	12/16/86
4,628,996	06/578,477	12/16/86
4,629,900	06/862,207	12/16/86
4,629,007	06/701,749	12/16/86
4,629,014	06/691,009	12/16/86
4,629,020	06/739,079	12/16/86
4,629,032	06/740,314	12/16/86
4,629,034	06/627,640	12/16/86
4,629,036	06/639,736	12/16/86
4,629,040	06/649,700	12/16/86
4,629,041	06/596,466	12/16/86
4,629,048	06/818,893	12/16/86
4,629,055	06/691,778	12/16/86
4,629,062	06/527,295	12/16/86
4,629,065	06/814,081	12/16/86
4,629,066	06/713,249	12/16/86
4,629,067	06/743,495	12/16/86
4,629,068	06/779,930	12/16/86
4,629,069	06/781,777	12/16/86
4,629,077	06/725,269	12/16/86
4,629,079	06/646,730	12/16/86
4,629,083	06/713,399	12/16/86
4,629,087	06/667,649	12/16/86
4,629,092	06/652,069	12/16/86
4,629,095	06/672,363	12/16/86
4,629,099	06/769,714	12/16/86
4,629,103	06/760,098	12/16/86
4,629,104	06/646,437	12/16/86
4,629,108	06/704,278	12/16/86
4,629,110	06/779,683	12/16/86
4,629,113	06/658,290	12/16/86
4,629,114	06/424,160	12/16/86
4,629,120	06/572,704	12/16/86
4,629,129	06/654,847	12/16/86
4,629,134	06/717,583	12/16/86
4,629,137	06/719,209	12/16/86
4,629,142	06/733,682	12/16/86
4,629,151	06/753,445	12/16/86
4,629,153	06/681,103	12/16/86
4,629,154	06/746,862	12/16/86
4,629,163	06/715,456	12/16/86
4,629,179	06/627,119	12/16/86
4,629,180	06/738,388	12/16/86
4,629,184	06/801,840	12/16/86
4,629,185	06/753,970	12/16/86
4,629,186	06/724,601	12/16/86
4,629,187	06/713,024	12/16/86
4,629,191	06/751,956	12/16/86
4,629,192	06/735,614	12/16/86
4,629,198	06/666,227	12/16/86
4,629,205	06/595,570	12/16/86
4,629,207	06/795,204	12/16/86
4,629,220	06/527,186	12/16/86
4,629,228	06/798,330	12/16/86
4,629,229	06/764,719	12/16/86
4,629,231	06/684,571	12/16/86
4,629,234	06/769,729	12/16/86
4,629,236	06/751,958	12/16/86
4,629,238	06/725,333	12/16/86
4,629,240	06/746,743	12/16/86
4,629,243	06/718,749	12/16/86
4,629,253	06/818,959	12/16/86
4,629,263	06/657,646	12/16/86
4,629,269	06/275,411	12/16/86
4,629,274	06/782,890	12/16/86
4,629,276	06/774,551	12/16/86
4,629,280	06/810,528	12/16/86
4,629,289	06/589,316	12/16/86
4,629,291	06/597,539	12/16/86
4,629,296	06/600,102	12/16/86
4,629,297	06/779,403	12/16/86
4,629,320	06/473,380	12/16/86
4,629,334	06/723,809	12/16/86
4,629,354	06/789,263	12/16/86
4,629,361	06/558,967	12/16/86
4,629,363	06/667,780	12/16/86
4,629,364	06/758,891	12/16/86
4,629,369	06/666,057	12/16/86

Patent Number	Serial Number	Issue Date
4,629,379	06/680,611	12/16/86
4,629,383	06/570,856	12/16/86
4,629,386	06/801,800	12/16/86
4,629,387	06/705,544	12/16/86
4,629,401	06/750,531	12/16/86
4,629,402	06/672,809	12/16/86
4,629,404	06/747,052	12/16/86
4,629,410	06/518,126	12/16/86
4,629,411	06/621,466	12/16/86
4,629,417	06/785,776	12/16/86
4,629,418	06/785,777	12/16/86
4,629,434	06/672,813	12/16/86
4,629,435	06/777,193	12/16/86
4,629,439	06/555,725	12/16/86
4,629,458	06/705,782	12/16/86
4,629,460	06/624,196	12/16/86
4,629,490	06/664,105	12/16/86
4,629,495	06/513,464	12/16/86
4,629,498	06/729,891	12/16/86
4,629,502	06/664,733	12/16/86
4,629,509	06/748,367	12/16/86
4,629,523	06/465,352	12/16/86
4,629,527	06/800,236	12/16/86
4,629,536	06/710,924	12/16/86
4,629,538	06/795,895	12/16/86
4,629,553	06/760,834	12/16/86
4,629,572	06/834,261	12/16/86
4,629,583	06/743,528	12/16/86
4,629,586	06/742,301	12/16/86
4,629,604	06/557,250	12/16/86
4,629,607	06/686,993	12/16/86
4,629,609	06/674,018	12/16/86
4,629,614	06/794,507	12/16/86
4,629,617	06/765,074	12/16/86
4,629,627	06/517,328	12/16/86
4,629,630	06/605,107	12/16/86
4,629,631	06/773,816	12/16/86
4,629,635	06/590,117	12/16/86
4,629,651	06/797,849	12/16/86
4,629,652	06/656,820	12/16/86
4,629,674	06/625,536	12/16/86
4,629,675	06/596,193	12/16/86
4,629,706	06/622,722	12/16/86
4,629,708	06/611,492	12/16/86
4,629,729	06/763,767	12/16/86
4,629,730	06/722,038	12/16/86
4,629,732	06/600,581	12/16/86
4,629,733	06/625,020	12/16/86
4,629,734	06/610,624	12/16/86
4,629,735	06/691,823	12/16/86
4,629,736	06/656,165	12/16/86
4,629,737	06/513,869	12/16/86
4,629,776	06/809,601	12/16/86
4,629,787	06/394,749	12/16/86
4,629,789	06/789,995	12/16/86
4,629,793	06/741,616	12/16/86
4,629,805	06/726,603	12/16/86
4,629,812	06/294,032	12/16/86
4,629,813	06/733,821	12/16/86
4,629,815	06/276,481	12/16/86
4,629,826	06/767,829	12/16/86
4,629,834	06/666,654	12/16/86
4,629,837	06/777,413	12/16/86
4,629,845	06/691,781	12/16/86
4,629,847	06/795,784	12/16/86
4,629,855	06/682,842	12/16/86
4,629,859	06/722,808	12/16/86
4,629,866	06/659,458	12/16/86
4,629,870	06/770,262	12/16/86
4,629,873	06/578,602	12/16/86
4,629,874	06/686,794	12/16/86
4,629,878	06/577,895	12/16/86
4,629,896	06/581,073	12/16/86
4,629,899	06/817,167	12/16/86
4,629,903	06/658,967	12/16/86
4,629,904	06/591,952	12/16/86
4,629,905	06/750,143	12/16/86
4,629,913	06/491,863	12/16/86
4,629,928	06/724,680	12/16/86
4,629,939	06/684,519	12/16/86
4,629,941	06/689,315	12/16/86
4,629,943	06/616,492	12/16/86
4,629,947	06/719,605	12/16/86
4,629,949	06/666,307	12/16/86
4,629,950	06/780,827	12/16/86
4,629,957	06/714,922	12/16/86
4,629,963	06/666,970	12/16/86
4,629,964	06/536,752	12/16/86
4,629,965	06/705,685	12/16/86
4,630,014	06/718,693	12/16/86
4,630,020	06/713,619	12/16/86
4,630,037	06/630,986	12/16/86
4,630,047	06/666,821	12/16/86
4,630,061	06/620,927	12/16/86
4,630,084	06/724,792	12/16/86
4,630,107	06/598,642	12/16/86
4,630,109	06/706,952	12/16/86
4,630,110	06/583,045	12/16/86
4,630,115	06/681,994	12/16/86
4,630,127	06/710,301	12/16/86
4,630,134	06/546,717	12/16/86
4,630,139	06/795,320	12/16/86
4,630,141	06/781,099	12/16/86
4,630,157	06/578,347	12/16/86
4,630,167	06/710,570	12/16/86
4,630,176	06/801,111	12/16/86
4,630,177	06/660,906	12/16/86
4,630,193	06/428,488	12/16/86
4,630,203	06/565,932	12/16/86
4,630,211	06/602,696	12/16/86
4,630,214	06/600,286	12/16/86
4,630,215	06/547,375	12/16/86
4,630,229	06/467,761	12/16/86
4,630,234	06/483,545	12/16/86
4,630,247	06/660,527	12/16/86
4,630,255	06/687,897	12/16/86
4,630,278	06/632,729	12/16/86
4,630,292	06/639,735	12/16/86
4,630,303	06/657,279	12/16/86
4,630,306	06/601,340	12/16/86

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b).

4,342,988, Re. S. N. 07/640,290, Filed Jan. 11, 1991, Cl. 340/679, RUPTURE DISC ALARM SYSTEM, Leonard K. Thompson, Owner of Record: *Continental Disc Corp., Kansas City, Mo.*, Attorney or Agent: Paul E. Krieger, Ex. Gp.: 268

4,789,855, Re. S. N. 07/622,613, Cl. 340/703, DEVICE FOR EDITING DOCUMENT IN COLORS, Masayoshi Ozeki, Owner of Record: *Hitachi, Ltd., Tokyo, Japan*, Attorney or Agent: Donald R. Antonelli, Ex. Gp.: 269

4,797,160, Re. S. N. 07/638,827, Filed Jan. 8, 1991, Cl. 106/660, PHASE CHANGE COMPOSITIONS, Ival O. Salyer, Owner of Record: *University of Dayton, Dayton, Ohio*, Attorney or Agent: Richard A. Killworth, Ex. Gp.: 118

4,797,661, Re. S. N. 07/639,819, Filed Jan 9, 1991, Cl. 340/664, MOTION SENSING DEVICE, Wallace F. Wiley, Owner of Record: *Robert Hooke Memorial Laboratories Inc., Prairie Village, Ks.*, Attorney or Agent: Frank R. Agovino, Ex. Gp.: 268

4,800,348, Re. S. N. 07/616,167, Filed Nov. 20, 1990, Cl. 333/202, ADJUSTABLE ELECTRONIC FILTER AND METHOD OF TUNING SAME, George C. Rosar, et al., Owner of Record: *Motorola, Inc., Schaumburg, Ill.*, Attorney or Agent: Ronald R. Hackbart, Ex. Gp.: 252

4,802,364, Re. S. N. 07/640,264, Filed Jan. 11, 1991, Cl. 73/505, ANGULAR RATE SENSOR, Donald R. Cage, et al., Owner of Record: *Inventor*, Attorney or Agent: Donald M. Duft, Ex. Gp.: 265

4,817,817, Re. S. N. 07/639,914, Filed Jan. 10, 1991, Cl. 220/445, DOUBLE WALL STORAGE TANK AND METHOD OF MAKING SAME, David T. Palazzo, Owner of Record: *Inventor*, Attorney or Agent: C. Douglas McDonald, Ex. Gp.: 241

4,951,185, Re. S. N. 07/639,557, Filed Dec. 20, 1990, Cl. 363/17, RESONANT INVERTER EMPLOYING FREQUENCY AND PHASE MODULATION USING OPTIMAL TRAJECTORY CONTROL, Michael J. Schutten et al., Owner of Record: *General Electric Co., Schenectady, N.Y.*, Attorney or Agent: Jill M. Breedlove, Ex. Gp.: 212

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

4,376,286, Reexam. No. 90/002,254, Requested Jan. 17, 1991, Cl. 357/023.4, HIGH POWER MOSFET WITH LOW ON RESISTANCE AND HIGH BREAKDOWN VOLTAGE, Alexander Lidow, et al., Owner of Record: *International Rectifier Corp., Los Angeles, Calif.*, Attorney or Agent: Samuel H. Weiner, Ostrolenk, Faber, Gerb & Soffen, New York, N.Y., Ex. Gp.: 258, Requester: Harris Corp., Melbourne, Fla.

Errata

"All reference to Patent No. 4,957,825 to Masaaki Futamoto et al. of Kanagawa-Ken, Japan for `MAGNETIC RECORDING MEDIUM AND PROCESS FOR PRODUCING THE SAME' appearing in the Official Gazette of Sept. 18, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,982,319 to Vance J. Nau et al. of Calif. for `CONTROL SYSTEM FOR A SAMPLE PREPARATION SYSTEM' appearing in the Official Gazette of Jan. 1, 1991 should be deleted since no patent was granted."

"All reference to Patent No. 4,981,910 to Aubert Y. Coran et al. of Ohio for `RUBBER COMPOSITIONS CONTAINING POLYMERIC ACTIVATORS' appearing in the Official Gazette of Jan. 1, 1991 should be deleted since no patent was granted."

"All reference to Patent No. 4,983,018 to David L. Jungkman of New Hampshire for `METHOD AND APPARATUS FOR PROVIDING A MOSIAC LENS ARRAY' appearing in the Official Gazette of Jan. 8, 1991 should be deleted since no patent was granted."

REGISTRATION TO PRACTICE

The results of the examination for registration to practice before the United States Patent and Trademark Office held on October 10, 1990 were mailed to 712 candidates. The following list contains the names of the 429 persons who successfully passed the examination and who are entitled at this time to receive provisional recognition pursuant to 37 CFR §10.9(a) have been given the same to prepare and prosecute applications before the Office until their registration certificates are mailed to them. Final approval for registration is subject to establishing to the satisfaction of the Director of the Office of Enrollment and Discipline that the person seeking registration is of good moral character and repute. 37 CFR § 10.7(a). Accordingly, any information tending to affect the eligibility of any of the following persons on moral, ethical, or other grounds should be furnished to the Director of Enrollment and Discipline on or before April 11, 1991.

Jan. 29, 1991 CAMERON WEIFFENBACH, *Director*
Office of Enrollment and Discipline

Abramson, Ronald, 55 Hudson St., #5C, New York, N.Y. 10013
Adams, Michael P., 1070 Mearns Meadow, #635, Austin, Tex. 78758
Ainbinder, Zarah, 1300 Grinnell Rd., Wilmington, Del. 19803
Anand, Mona, 4400 Brambleridge La., Midland, Mich. 48640
Anderson, Edmund P., 13800 Glendale Trail, Savage, Minn. 55378
Anderson, William H., 195 Linden Ave., Highlands, N.J. 07732
Aruti, Ike, 257-37 149th Rd., Rosedale, N.Y. 11422
Audia, Vicki H., 2997 Patapsco Rd., Finksburg, Md. 21048
Austin, R. Russel, 215 Butterfield Dr., Novato, Calif. 94945
Austin, Steven G., 9262 W. Hialeah Pl., Littleton, Colo. 80123
Bach, Mark C., 3500 West 84th Pl., Chicago, Ill. 60652
Baggot, Breffni X., 154 Fairfield Ave., Hartford, Conn. 06114
Baghdadi, Aslan, 11428 Beechgrove La., Potomac, Md. 20854
Bangor, Paul D., Jr., 6340 Green Valley Cir., #3-206, Culver City, Calif. 90230
Banta, Teresa J., 3133 Connecticut Ave., N.W., #311, Washington, D.C. 20008
Bardes, Bruce P., 7651 Cornell Rd., Montgomery, Ohio 45242
Barrett, Joseph B., 293 N. Ashland, Palatine, Ill. 60067
Bartek, James E., 2461 Richards Dr., S.E., Grand Rapids, Mich. 49506
Bartholomew, Steven R., 381 Millington La., Aurora, Ill. 60504
Bartony, Henry E., Jr., 1513 Teal Trase, Pittsburgh, Pa. 15237
Basch, Duane C., 156 Shepard St., Rochester, N.Y. 14620
Basinski, Erwin J., 1456 Jones St., #37, San Francisco, Calif. 94109
Bastian, Kevin L., 555 Clayton Ave., El Cerrito, Calif. 94530
Becker, Jennifer F., 4200 Woodland Rd., Circle Pines, Minn. 55014
Bell, Robert P., 8033 Washington, Rd., Alexandria, Va. 22308
Bennett, Dennis A., 1866 South Custer, Fayetteville, Ak. 72701
Bergin, James P., 42 W. 76 St., # 2C, New York, N.Y. 10023
Berliner, Brian M., 5715 W. Olympic Blvd., #207, Los Angeles, Calif. 90036
Bernstein, Bruce G., 2725 Connecticut Ave., #605, Washington, D.C. 20008
Berquist, James D., 2250 Clarendon Blvd., #1513, Arlington, Va. 22201
Bickel, Riva W., 2537 Country La., Baldwinsville, N.Y. 13027
Bjur, Richard A., 7895 Meadow Vista Dr., Reno, Nev. 89511
Bonzagni, Mary R., 7 Ripley St., Wilbraham, Mass. 01095
Boone, Gary, 6481 Mesedge La., Colorado Springs, Colo. 80919
Borrego, Fernando A., 2400 Grandview Ave., #6, Cincinnati, Ohio 45206
Botsch, Bradley J., 5117 W. Jupiter Way, Chandler, Ariz. 85226
Boyadjian, Livia S., 49-35 Annandale La., Little Neck, N.Y. 11362
Brandt, Brian S., 109 Whitson St., Forest Hills, N.Y. 11375
Brickner, Scott W., 3868 Marquis Pl., Woodbridge, Va. 22192
Brignac, Len R., 1515 Marengo, #C, New Orleans, La. 70115
Brill, Gerow D., 99 Clinton St., #501, Concord, N.H. 03301
Brinich, Kenneth L., 514 State St., Bend, Oreg. 97701
Brown, Glenn C., 4814 Indiana Ave., N.E., Salem, Oreg. 97305
Brown, Kathryn M., 61A Reynolds St., City Island, N.Y. 10464
Brush, David D., 36 Susan Ave., St. Paul, Minn. 55116
Bucher, Steven, 205 Cleveland Ave. South, St. Paul, Minn. 55105
Buford, Kevin A., 2010 Winrock St., #649, Houston, Tex. 77057
Burgoon, Richard P., Jr., 2520 Stagecoach Trail, Chino Hills, Calif. 91709
Burns, Barbara M., 11361 Rockland, Redford, Mich. 48239
Butler, Gregory Bradley, 54 Oceanside Dr., Scituate, Mass. 02066

Callaghan, Terry S., 1179 N. Vernon St., Arlington, Va. 22201
Cameron, Mary K., 250 S. Whiting St., #904, Alexandria, Va. 22304
Campbell, Richard E., 13900 Tahiti Way, #221, Marina Del Rey, Calif. 90292
Cannatti, Micheal Rocco, 5740 Marquita, #4, Dallas, Tex. 75206
Canter, Bruce M., 1504 Berkeley St., #B, Santa Monica, Calif. 90404
Capello, Susan A., 25 Zabriskie St., #3C, Hackensack, N.J. 07601
Caprio, Frank M. 425 Owens Dr. S.E., Huntsville, Ala. 35801
Carpenter, Robert Kingsley, III, 1600 S. Joyce St., #C1504, Arlington, Va. 22202
Castiglione, Vincent A., 270-08 Union Turnpike, New Hyde Park, N.Y. 11040
Centanni, Michael A., 7335 Beresford Ave., Parma, Ohio 44130
Chambers, Daniel M., 2217 N. Memory La., Westlake Village, Calif. 91361
Champlin, Judson K., 433 S. 7th St., #2108, Minneapolis, Minn. 55415
Chavez, Paula N., 712 Matadero Ave., Palo Alto, Calif. 94306
Chun, Mellissa L., 2111 Jeff. Davis Hwy., #312N, Arlington, Va. 22202
Cicero, Michael Anthony, 831 Cleveland St., #273, Greenville, S. C. 29601
Clark, Janet Pauline, 909 Rose Dr., Benicia, Calif. 94510
Clark, Leslie J., 335 Lost Rock Dr., Webster, Tex. 77598
Clement, Alan B., 500-512 High Point Dr., Hartsdale, N.Y. 10530
Clodfelter, Steven M., 235 High Rd., Madison, Ala. 35758
Cohen, Charles E., 6816 Chestnut Ave., Falls Church, Va. 22042
Collier, Susan B., P.O. Box 367, Lehi, Utah 84043
Conrad, Philip L., 22-B Mill St., Woburn, Mass. 01801
Cooper, J. Carl., Pixel Instruments Corp., 15288 Via Pinto, Monte Sereno, Calif. 95030
Copeland, Barry Lee, 708 Shady Creek, Kennedale, Tex. 76060
Cordray, Monique L., 3809 Usher Ct., Alexandria, Va. 22304
Corrigan, George R., N6610 Shorewood Hills Rd., Lake Mills, Wisc. 53551
Corstanje, Brahm J., 160 Bent Tree Dr., #1B, Fairfield, Ohio 45014
Corvin, Carl D., 5509 Colony Court, Bartlesville, Okla. 74006
Cote, Robert A., 75-35 198th St., Flushing, N.Y. 11366
Courtney, Roland S., 17747 N. Nunneley Rd., Mt. Clemens, Mich. 48043
Crouch, Robert G., 4899 Kellogg Cir., Boulder, Colo. 80303
Curtin, Joseph P., 7222 Single Wheel Path, Columbia, Md. 21046
Czarnota, Paul S., 20001 Lamar, Mt. Clemens, Mich. 48044
Daley, Christopher, 832 N. Frederick St., Arlington, Va. 22205
Daniels, John J., P.O. Box 929. Norwalk, Conn. 06856
Date-Warrick, Noreen L., 211 Adams Dr., Midland, Mich. 48640
Davis, Mark L., 226 Overhill Rd., Orinda, Calif. 94563
Davis, Tyrone, 7225 S. Calumet, Chicago, Ill. 60619
de la Rosa, Jose R., 180 Lafayette Ave., #4G, Passiac, N.J. 07055
Dengler, Theobald J., 70 Boyd St., Long Beach, N.Y. 11561
Deschere, Linda M., 28120 S. Harwich, Farmington Hills, Mich. 48334
Dillahunty, Mary Ann, 107 San Pedro Rd., Half Moon Bay, Calif. 94019
Dodek, Alvin B., 437 W. Grant Pl., Unit C, Chicago, Ill. 60614
Dondrea, John A., 3525 Country Square Dr., #M-208, Carrollton, Tex. 75006
Donley, Garrett C., 619 Black Gates Rd., Wilmington, Del. 19803
Donner, Bernard Gregory, 907 N. Milwaukee Ave., #2-D, Libertyville, Ill. 60048
Douma, Mark H., 1001 Manning St., Great Falls, Va. 22066
Dowler, Michael Scott, 14531 Cindywood, Houston, Tex. 77079
Downes, James S., 1864 N. Orchard, Chicago, Ill. 60614
Drake, James J., 115 Ridgeland Dr., Amherst, Ohio 44001
Drew, Gary R., 15 Highgate Rd., Chelmsford, Mass. 01824
Dunn, Diane F., 24 Huntley Rd., Holmdel, N.J. 07733
Dunn, Tracy J., 1717 Norman Way, Madison, Wisc. 53765
Dweck, Robert S., 733-A 18th Ave., San Francisco, Calif. 94121
Eaves, James C., Jr., 2402 Lexford Ct., Louisville, Ky. 40242
Elbing, Kristofer E., 36 Irving St., #2, Boston, Mass. 02114
Ellinger, Mark S., 14902 64th Place N., Maple Grove, Minn. 55369
England, John M., Jr., P.O. Box 1674, Alexandria, Va. 22313
Erbe, Richard S., 1780 Aspen Village Way, West Covina, Calif. 91791
Fairhall, Thomas A., 316 Cromwell Ct., Westmont, Ill. 60559
Fallek, Debra A., 203 Regent Dr., Lido Beach, N.Y. 11561
Farell, Raymond E., 3315 Wyndham Cir., #1236, Alexandria, Va. 22302
Felix, Thomas C., 12092 Atrium Dr., Saratoga, Calif. 95070
Fejer, Mark E., 905 Echo La., Glenview, Ill. 60025
Ferrell, John S., 1719 Martin Jue St., San Jose, Calif. 95131
Fischman, Steven, 89-37 91st St., Woodhaven, N.Y. 11421
Flaxman, Howard N., 732 Dover St., Baltimore, Md. 21230
Fleshner, Mark L. 2300 Pimmit Dr., #304W, Falls Church, Va. 22043
Floam, David Andrew, 5801 Inman Park Cir., #320, Rockville, Md. 20852
Foley, James M., 3053 Sandy Hook Dr., Roseville, Minn. 55113
Fontana, Steven A., 27 Albin St., Concord N.H. 03301
Fortney, Andrew D., 2000 S. Eads St., #610, Arlington, Va. 22202
Fowler, Mavis Kathleen, 156-20 Riverside Dr., West, #8J, New York, N.Y. 10032
Fraser, Janis K., 48 Marshall St., Newton Centre, Mass. 02159
Frazier, Jeffery D., 302 Portico Aisle, Irvine, Calif. 92714
Fredeen, Thomas E., 2092 Randy Ave, White Bear Lake, Minn. 55110
Fredlund, Robert R., Jr., 1056 El Capitan Dr., Danville, Calif. 94526
Frey, Mark S., 1675 York Ave., #32J, New York, N.Y. 10128
Frickey, Darryl P., 200 Locust St., #30-H, Philadelphia, Pa. 19106
Friedland, David K., 916 Calibre Woods Dr., Atlanta, Ga. 30329
Fuchs, Joseph A., 155 Harbor Dr., Suite 4606, Chicago, Ill. 60601
Garred, Mark B., 24121-F Hollyoak, Laguna Hills, Calif. 92656
Gennaro, Jane Eileen, 16 Laga Ct., Ringoes, N.J. 08551
Gerstein, Robert M., 1013 W. Webster, Chicago, Ill. 60614
Geurts, Bryan A., 1579 Prinston Ave., Salt Lake City, Utah 84105
Gibson, Peter O., 2110 N. Charles St., Baltimore, Md. 21218
Gilman, Michael Robert, 126 Touraine Ave., Port Chester, N.Y. 10573
Girdwood, Daniel L., 507 Edgeworth, S.E., Grand Rapids, Mich. 49546
Goldfinger, Abram M., 2601 Pennsylvania Ave., #1026, Philadelphia, Pa. 19130
Goldman, Ron, 1138 Roxbury Dr., Westbury, N.Y. 11590
Goldschmidt, John W., Jr., 1921 Spruce St., Philadelphia, Pa. 19103
Goldstein, Kevin William, 400 S. Manoa Rd., Havertown, Pa. 19083
Golrick, Mary E., 2918 Berkshire Rd., Cleveland Hgts., Ohio 44118
Goren, David J., 16 Sanborn Rd., Orinda, Calif. 94563
Gosnell, Guy R., 5 Hillside Dr., Brighton, Ill. 62012
Grant, Jonathan E., 2628 East-West Hwy., Chevy Chase, Md. 20815
Grether, Heinz D., 9201 Simmons, #104, Austin, Tex. 78701
Griffith, Calvin P., 14715 Drexmore Rd., Shaker Heights, Ohio 44120
Grillo, Michael, 145 Brewster Rd., Bristol, Conn. 06010
Guise, Jeffrey William, 13255 Denaea Rd., San Diego, Calif. 92130
Gyure, Barbara A., 2818 Madison Dr., Longmont, Colo. 80503
Haake, Deborah L., 5289 Dobson Way, Culver City, Calif. 90230
Hahn, Peter K., 16903 Colony Terrace Dr., Sugarland, Tex. 77479
Haley, Jeffery T., 4730 91st Ave., S.E., Mercer Island, Wash. 98040
Hammitte, Ann Lamport., 60 Nahant Ave., Dorchester, Mass. 02122
Hannah-White, Cynthia M., P.O. Box 48, Slaterville Springs, N.Y. 14881
Harder, Robert D., 4380 Courser Ct., San Diego, Calif. 92117
Hargrove, Keith L., 3663 Arbutus Ave., Palo Alto, Calif. 94303

Harrington, Christopher D., 149 Hidden Lake Ct., S.E., Grand Rapids, Mich. 49546
Harris, Charles H., 800 Third St., S.W., #3, Washington. D.C. 20024
Hauth, Gregory W.J., 225 97th Pl., S.E., Everette, Wash. 98208
Hayes, Daniel L., 12720 East 31st., Spokane, Wash. 99216
Hayes, David Lloyd, 420 Correas St., Half Moon Bay, Calif. 94019
Hayman, Selma, 32 Rose Cir., Newark, Del. 19711
Heaphy, Barbara A., 441 E. Erie, #4613, Chicago, Ill. 60611
Heldmann, Eileen, 309 Union St., Carlstadt, N.J. 07072
Hermenau, Ronald S., 14 Essex St., Concord, N.H. 03301
Hildebrand, Christa, 110 W. 14th St., #10, New York, N.Y. 10011
Hillman, Van Jean F., 1182 Grove St., #D, Bensenville, Ill. 60106
Holmes, Stephen J., 79 Cresthill Rd., Brighton, Mass. 02135
Horton, Carl B., 6250 Edsall Rd., #102E., Alexandria, Va. 22312
House, Wayne D., Rt. 4 Box 948, Flagstaff, Ariz. 86001
Howells, Stacy L., 11545 Hadar Dr., San Diego, Calif. 92126
Howley, David A., 3 W. Nottingham Apts., R.F.D. 3, Barrington, N.H. 03825
Hu, Irene Yung-pei, 27 Ferncroft Rd., Tewksbury, Mass. 01876
Huis, Randolf J., 33 Bishops Dr., Aston, Pa. 19014
Hynds, Joseph A., 2813 S. Joyce St., Arlington, Va. 22202
Iwanicki, John P., 18 Dunstan St., West Newton, Mass. 02165
Jackson, Jean Heck, 7802 Ariel Way, McLean, Va. 22102
Jenkins, Matthew Richard, 158 Brookmount Rd., Dayton, Ohio 45429
Johnson, Doris J., 7221 Tod St., Falls Church, Va. 22046
Johnson, Keith L., 17211 Chatsworth St., #30, Granada Hills, Calif. 91344
Jones, Raymond C., 14019 Betsy Ross La., Centreville, Va. 22020
Jorgenson, Lisa K., 4103 Mockingbird La., Colleyville, Tex. 76034
Josephs, David R., 2843 N. Clark St., #3F, Chicago, Ill. 60657
Jurgovan, Jon M., 7508 Hamilton Spring Rd., Bethesda, Md. 20817
Kalyanaraman, Palaiyur S., 184 Marian Ave., Fanwood, N.J. 07023
Kappes, Kyle K., 621 S. Plymouth Ct., #707, Chicago, Ill. 60605
Kastelic, John A., 20230 Lindbergh Ave., Euclid, Ohio 44119
Kaufman, Craig R., 1121 Arlington Blvd., #734, Arlington, Va. 22209
Kelley, Robin D., 508 Green St., #3, Cambridge, Mass. 02139
Kelly, Joseph R., 1150 Hennepin Ave., #1901, Minneapolis, Minn. 55402
Kelly, Patrick J., 914 Collier Rd., N.W., #A-18, Atlanta, Ga. 30318
Kenaga, Michael L., 4205 Clausen Ave., Western Springs, Ill. 60558
Kesslen, Mark P., 314 W. 77th St., #2A, New York, N.Y. 10024
Kiewit, David A., 2420 Seneca Ct., Palm Harbor, Fla. 34683
Kimball, Paul C., 2801 Strauss Terr., Silver Spring, Md. 20904
Kimbell, Daniel R., 4532 Rockland Pl., La Canada, Calif. 91011
King, Karen K., 312 Hanover Way, New Castle, Del. 19720
Kingsford-Smith, Charles A., P.O. Box 960, Mukilteo, Wash. 98275
Kirschner, Michael K., 44-111 Kahinani Way, Kaneohe, Hi. 96744
Klima, Timothy J., 2117 Bancroft Pl., N.W., Washington, D.C. 20008
Knoll, Jeffrey G., 15737 Orlan Brook Dr., Orlando Park, Ill. 60462
Knuth, Randall James, 2311 Point West Dr., #1B, Ft. Wayne, ind. 46808
Kock, Ronald W., 577 Abilene Trail, Wyoming, Ohio 45215
Korniczky, Stephen S., 11931 Avon Way, #1, Los Angeles, Calif. 90066
Kovich, Michael P., 1385 Country Place Dr., Houston, Tex. 77079
Kowalik, Francis C., 5311 W. Schubert Ave., Chicago, Ill. 60639
Kraai, Gerald M., 8815 Cedar, Prairie Village, Kans. 66207
Kralik, Gabriel P., 40 River Rd., #7B, Roosevelt Island, N.Y. 10044
Krupen, Karen I., 2000 S. Eads St., #509, Arlington, Va. 22202
Kulbaski, James J., 3101 Hawthorne Dr., N.E., Washington, D.C. 20017
Kumar, Johnny A., 1301 N. Courthouse Rd., #806, Arlington, Va. 22201
Kupper, Walter E., 65 Barnsdale Rd., Madison, N.J. 07940
Kurys, Barbara E., 2467 Route 10 E., #39-6B, Morris Plains. N.J. 07950
Labgold, Marc R., 2301 Jeff. Davis Hwy., #1520, Arlington, Va. 22202
Lagaly, Thomas C., 2713 Redfield Pl., Cincinnati, Ohio 45230
LaMarre, Mark F., 1437 Clairmont Ct., Vernon Hills, Ill. 60061
Lamming, John H., 8627 Henrietta Ave., Brentwood, Mo. 63144
LaMorte, Eric A., 187 Woolley Ave., Staten Island, N.Y. 10314
Lando, Peter C., 11 Perry Ave., Concord, N.H. 03301
Lathrop, David N., 36146 Elba Pl., Fremont, Calif. 94537
Lechtenberger, Joseph D., 2303 Gray Falls, Houston, Tex. 77077
Lee, Lewis C., 1400 S. Joyce St., #B-511, Arlington, Va. 22202
Leichter, Louis Malcolm, 909 Mendakota Ct., Mendota Heights, Minn. 55120
Levin, Nathaniel, 50D Pondview Rd., Rye, N.Y. 10580
Lindeman, Jeffrey A., 7229 Allan Ave., Falls Church, Va. 22046
Lingbeck, David A., 9709 E. Jewell Ave., #205, Denver, Colo. 80231
Liss, Margaret M., 6413 Jacobs Way, Madison, Wisc. 53711
Loginov, William A., 38 Doiron Rd., Windham, N.H. 03079
Love, Richard B., 281 Lenox Ave., Oakland, Calif. 94610
Lupo, Dickson M., 321 N. Canterbury Rd., Charlotte, N.C. 28211
MacKinnon, Ian D., 2507 Cohansey St., Roseville, Minn. 55113
Mahurin, J. L., Rt. 1, Box 320a, Traskwood, Ark. 72167
Maire, David G., 3908 Bridgewood Dr., Murryville, Pa. 15668
Malm, Robert E., 16624 Pequeno Pl., Los Angeles, Calif. 90272
Malur, Shrinath, 7922 Towerbell Ct., Anandale, Va. 22003
Malvone, Christopher N., 212 Chambers St., South Plainfield, N.J. 07080
Mann, Gary D., 1203 North Slope Dr., Carrollton, Tex. 75007
Manning, Guy Vincent, 4912 Winesanker Way, Ft. Worth, Tex. 76133
Marcellino, Albert J., 345 Cornell Ave., Swarthmore, Pa. 19081
Marcus-Wyner, Lynn, 124 Bishop Ave., Point Richmond, Calif. 94801
Martin, Paul W., 501 Young Dr., Fairborn, Ohio 45324
Masteller, Harold I., Jr., 3325 Grenwood Dr., Springtown, Pa. 18081
Masterson, David M., 821 W. 61st St., Peoria, Ill. 61615
Matzner, Markus, 23 Marshall Dr., Edison, N.J. 08817
Maxin, John Lawrence, 20765 Burbank Blvd., Woodland Hills, Calif. 91367
McCann, Florence Fusco, 6002 Flaming Oaks Circle, Norman, Okla. 73071
McCann, Steven, P.O. Box 1551, Concord, N.H. 03301
McCartin, Michael T., 22 Merriman Rd., Newark, Del. 19713
McDonald, Scott P., 409 Ridge Ave., Clarendon Hills, Ill. 60514
McDonell, Leslie A., 330 E. 38th St., #18G, New York, N.Y. 10016
McDowall, Paul Haven, 6601 Plymouth Ave. North, Golden Valley, Minn. 55427
McGarry, Annette Michele, 572S S. Woodlawn Ave., Chicago, Ill. 60637
McGurk, Harold Clayton IV, 417 N. Howard St., #202, Alexandria, Va. 22304
McKinney, J. Andrew, Jr., 2114 Shore Dr., Edgewater, Md. 21037
McMahon, Mary P., 208 Hanover St., Boston, Mass. 02113
Meder, Martin G., 121 Park Avenue, Highstown, N.J. 08520
Meece, Robert S., 1616 S.E. Manor Dr., Bartesville, Okla. 74006
Melville, Hope E., 121 S. Hope St., #316, Los Angeles, Calif. 90012
Mercier, Pamela J., 24 Stoneland Rd., #2, Shrewsbury, Mass. 01545
Metteauer, Michael S., 701A W. 32nd St., Austin, Tex. 78705
Meyertons, Eric B., 2901-A Oak Crest Ave., Austin, Tex. 78704
Miller, Cynthia R., 209-48 34th Ave., Bayside, N.Y. 11361
Miller, Kerry P.L., 1705 1st Ave., #3C, New York, N.Y. 10028
Miller, Lawrence Edward, 626 E. Wayland, Springfield, Mo. 65807
Mills, Timothy F., 183 Loomis Dr., Unit 114, West Hartford, Conn. 06107
Millstein, Larry S., 1533 South 28th St., #4, Arlington, Va. 22206
Milz, Michael E., 421 Colfax Ave., Clarendon Hills, Ill. 60514

Miraglia, Loretta A., 27 Chatfield Rd., Bronxville, N.Y. 10708
Moga, Thomas Traian, 20771 Woodland Glen, #101, Northville, Mich. 48167
Moncys, Linda M., 2555 N. Clark, #509, Chicago, Ill. 60614
Morris, James H., 404 Salem St., Wilmington, Del. 01887
Moser, Raymond R., Jr., 2147 Newhall St., #923, Santa Clara, Calif. 95050
Moura, Richard J., 12702 Lockleven La., Woodbridge, Va. 22192
Muffoletto, Kellie M., 44 Beaumont Dr., Amherst, N.Y. 14228
Muramatsu, Hisako, 27362 Lost Colt Dr., Laguna Hills, Calif. 92653
Murphy, John Joseph, 2300 Link Side Dr., #5, Cincinnati, Ohio 45245
Nelson, Lawrence W., P.O. Box 1745, Concord, N.H. 03301
Neville, Deborah A., 6412 Orange St., #2, Los Angeles, Calif 90048
Nighswander, J. Richard, 850 N. State, #29-F, Chicago, Ill. 60610
Nina, Driscoll A., Jr., P.O. Box 448, Kimberton, Pa. 19442
Noe, Keith F., RFD 3 Box 141, Laconia, N.H 03246
O'Dowd, Shawn W., 2234 Highland Ave, Falls Church, Va. 22046
Oberer, Richard B., 1063 W. 2450 N., Layton, Utah 84041
Oleski, Nancy A., 815 N. Humboldt, #501, San Mateo, Calif. 94401
Olszanski, Nellie C., 3275 S. Ammons St., #3-208, Lakewood, Colo. 80227
Onofrio, Dara L., 172 East 92nd St., #1B, New York, N.Y. 10128
Orr, Theresa A., 7100 Oakely Park, W. Bloomfield, Mich. 48323
Owen, Joan Rapp, 432 Joshua St., Columbia, S.C. 29205
Paikoff, Richard A., 23 Summit Trace Rd., Langhorne, Pa. 19047
Parker, Raymond S., III, 57 Hendricks Ave., Staten Island, N.Y. 10301
Parsons, George T., 2736 Aegean Dr., San Diego, Calif. 92139
Parsons, James E., P.O. Box 4201, Berkely, Calif. 94704
Pasqualini, Patricia A., 66 Madison Ave, #11L, New York, N.Y. 10016
Paul, David J., 24269 Hoskins Rd., Wilder, Id. 83676
Peer, Peter M., II, 1003 East 1300 South, Salt Lake City, Utah 84105
Peppard, Terry F., 4814 Marathon Dr., Madison, Wis. 53705
Perkins, Patricia Anne, 6502 225th Pl., SW, Mountlake Terrace, Wash. 98043
Perry, Robert F., 3005 Lighthouse Lane, Parlin, N.J. 08859
Persley, Sidney, 25 Cook Ave., Madison, N.J. 07940
Pessin, Karol M., 10568 Wellworth Ave., Los Angeles, Calif. 90024
Peters, Edward A., 16033 NE 153rd St., Woodinville, Wash. 98072
Piccolo, Joseph G., 2020 F. St., N.W., #426, Washington, D.C. 20006
Pickens, Scott Kevin, 2250 Clarendon Blvd., #1526, Arlington, Va. 22201
Pierce, Nelson Scott, 612 Farms Dr., Burlington, Mass. 01803
Piffat, Kathryn A., 56 Ledgewood Dr., Danvers, Mass. 01923
Pokalsky, Ann R., 25 Cheever Pl., Brooklyn, N.Y. 11231
Polley, Daniel S., 1101 S.W. 11 St., Boca Raton, Fla. 33486
Posorske, Laurence H., 26 Middlebridge Ct., Silver Spring, Md. 20906
Prendergast, William F., 6701 Menominee, Palos Heights, Ill. 60463
Pritchard, R. Wayne, 6917 Villa Hermosa, El Paso, Tex. 79912
Pyle, Jeffrey A., 2845 Lockett, Houston, Tex. 77021
Rabson, Michael S., 218 Downey St., San Francisco, Calif. 94117
Ramberg, Jeffrey R., 18 Old Manor Rd., Newark, Del. 19711
Rauchholz, William F., 315 East Nelson Ave, Alexandria, Va. 22301
Rawlins, Andrew E., 3311 Wyndham Circle, #3189, Alexandria, Va. 22302
Regan, Christopher F., 5824 Laurium Rd., Charlotte, N.C. 28226
Regard, Joseph T., III, 211 Pineridge Ct. Manor, Mandeville, La. 70448
Rehberg, Edward F., 115 E. Candlewyck, #701, Kalamazoo, Mich. 49001
Rehm, Peter H. 14245 Les Palms Circle, #2, Tampa, Fla. 33613
Reis, Jeffrey William, 1900 8th Ave. N., #7, Seattle, Wash. 98109
Rhoads, Donald L., 333 East 80th St., #4D, New York, N.Y. 10021
Rhyne, Lesley A., 330 E. 39th St., #15J, New York, N.Y. 10016
Robbins, John C., 417 Quaint Acres Dr., Silver Spring, Md. 20904
Roberts, Fred H., 2729 Helena Ave., North, St. Paul, Minn. 55128
Roberts, John H., 9 Norwich Ct., Midland, Mich. 48640
Robertson, David H., 2865 Sawgrass Trail, Lilburn, Ga. 30247
Robinson, James B., 21031 Flaming Arrow Trail, Crosby, Tex. 77532
Robinson, Jill L., 95 Shuey Dr., Moraga, Calif. 94556
Rodriguez, Manuel J., Jr., 2040 St. Louis Ave., Signal Hill, Calif. 90806
Roesel, Elizebeth Miller, 1600 N. Oak St., #305, Arlington, Va. 22202
Rogers, Donna M., 525 Hawthorne Pl. #904, Chicago, Ill. 60657
Rogers, Joan H., 1404 Winchester Dr., Midland, Mich. 48640
Romanik, George Joseph, 810 Farmington Ave., #302, West Hartford, Conn. 06119
Root, Lawrence A., 2148 Silentree Dr., Vienna, Va. 22182
Rose, Simone A., 2308 Patternbond Dr., Silver Spring, Md. 20902
Roth, Steven W., 381 Alric Dr., San Jose, Calif. 95123
Rudy, William A., Route 3, Box 73A, Platte City, Mo. 64079
Russell, Howard P., 9642 Meadowglen La., Houston, Tex. 77063
Russell, Linda K., 4708 Spring La., Baytown, Tex. 77521
Ryther, Mary Jo, 5431 N. East River Rd., #1405, Chicago, Ill. 60656
Sabatelli, Anthony D., 687 Reservoir Rd., Southbury, Conn. 06488
Samra, Robert A., 8820 Southwestern Blvd., #1105, Dallas, Tex. 75206
Samuels, Frederick N., 10301 Douglas Ave., Silver Spring, Md. 20902
Sand, Stephen J., 177 Boutwell St., Manchester, N.H. 03102
Santorsa, Michael Paul, 5700 Bloomfield Dr., Midland, Mich 48640
Scalise, Michael F., 3944-2 Hunters Ridge, Lansing, Mich. 48911
Scarborough, John H., 2002 Silver Lake Manor, Clementon, N.J. 08021
Schafer, Michele M., 2032 16th St., N.W., #1, Washington, D.C. 20009
Schechter, Daniel R., 14 Corlett Pl., Huntingdon Station, N.Y. 11746
Scherer, Donna E., 1031 34th St., Sacramento, Calif. 95816
Schira, Jeffery S., 132 Candler Oak Lane, Decatur, Ga. 30030
Schneider, Carol A., 17528 San Jose St., Granada Hills, Calif 91344
Schoonover, Donald R., Route 2, Box 145C, Lawson, Mo. 64062
Schroeder, R. Glenn, 30 Totten Pl., Bablon, N.Y. 11702
Schruhl, Robert A., 21721 Alderbrook, Mission Viejo, Calif. 92692
Schumm, Brooke, III, 4901 Wetheredsville Rd., Baltimore, Md. 21207
Schwartz, Jackie J., 1425 S. Eads St., #1104, Arlington, Va. 22202
Severson, Mary L., 1366 Cypress Ridge Circle, Stone Mountain, Ga. 30083
Sharpe, Richard A., 4901 Seminary Rd., #310, Alexandria, Va. 22311
Shaw, Laurence J., 404 Stewart Ave., #5, Ithaca, N.Y. 14850
Shay, Lucas K., 617 SE Castle Rd., Bartlesville, Okla. 74006
Shea, Michael J., 613 N. Tazewell St., Arlington, Va. 22203
Sher, Jaimes, 4064 Windhaven, Dallas, Tex. 75287
Simmons, Miriam G., 13960 North 47th St., Stillwater, Minn. 55082
Simons, Michele L., 31 Lakeview Dr., Atco, N.J. 08004
Skrabec, David J., 3642 N.W. 24th Terrace, Boca Raton, Fla. 33431
Sloane, Edwin A., 1040 Covington Rd., Los Altos, Calif. 94024
Slusher, Jeffrey L., 319 Palos Verdes Blvd., #408, Redondo Beach, Calif. 90277
Small, Dean D., 4650 N. Washington Blvd., #206, Arlington, Va. 22201

Smart, John A., 312 Wild Flower Park Lane, Mountain View, Calif. 94043
Smid, Dennis M., 49 Cedarcliff Dr., Wayne, N.J. 07470
Smith, William Patrick, 26 Duncan Ave., Pittsburgh, Pa. 15205
Soifer, Jonathan P., 7483 Shaftesbury Ave., St. Louis, Mo. 63130
Soltz, David L., 1510 N. Key Blvd., #46, Arlington, Va. 22209
Spaw, David E., 7403 N. Chestnut Commons, Menton, Ohio 4406
Spiering, M. Susan, 368 S. Saratoga St., St. Paul, Minn. 55105
Staudt, Daniel J., 9145 Jenny Cook Circle, Knoxville, Tenn. 37923
Stein, Michael D., 200 Locust St., #40, Philadelphia, Pa. 19103
Steinberg, Neil A., 72 Mt. Vernon St., Boston, Mass. 02108
Stemer, Werner H., 1717 SW 10th Ave., Ft. Lauderdale, Fla. 33315
Stiennon, Patrick J.G., 18 Glenside Circle, Madison, Wis. 53717
Stockstill, Charles J., 7102 Counter Pl., Va. 22015
Stoppelmoor, Wayne H., Jr., 7419 Normandy Dr. N.E., Cedar Rapids, Iowa 52402
Stover, George Byron, 49 S Street, N.W., Washington, D.C. 20001
Strode, Janelle D., 2069 S. Osage, Bartlesville, Okla. 74003
Sturtz, Gregory P., 6866 McGreegor St., Worthington, Ohio 43085
Suchodolski, Jeanne C., 3173 Wayside Plaza, #116, Walnut Creek, Calif. 94596
Sullivan, Daniel W., 2132 Biddle St., Wilmington, Del. 19805
Swift, Paul F., 800 Rogers Rd., Pa. 19007
Switzer, Joan E., 110A Hastings Way, Mt. Laurel, N.J. 08054
Tarzian, Jill A., 833 S. Bishop St., Chicago, Ill. 60607
Tenenbaum, Alan, 200 E. 89th St., #22H, New York, N.Y. 10128
Thallemer, John D., 4512 N. Saginaw, #911, Midland, Mich 48640
Thompson, Doris M., 8867 Highland Rd., Suite 124, Baton Rouge, La. 70808
Thorne, Gale H., 1056 Millcrest Circle, Bountiful, Utah 84010
Tulley, Douglas H., Jr., 21 Sylvan Ave., Queensbury, N.Y. 12804
Twait, Marianne J., 280 Picturesque Dr., Rochester, N.Y. 14616
Tymeson, Cynthia G., 10367 SW 50th Court, Cooper City, Fla. 33328
Ulmer, Duane C., 2108 E. Sugnet Rd., Midland, Mich. 48640
Van Dyke, Raymond, 550 Cedar Ave., Woodbridge, N.J. 07067
Vaz, Sarah Pfeifer, 39 Villawood La., St. Louis, Mo. 63119
Von Neida, Phillip H., 156 Summit Trace Rd., Langhorne, Pa. 19047
Waddell, Herbert H., 98 Robbins Ave., Berkeley Hgts., N.J. 07922
Wahlin, Kenneth D., N. 60 W. 23727 Juniper La., Sussex, Wis. 53089
Walker, Darcell, 8107 Carvel Lane, Houston, Tex. 77036
Wallace, T. Lester, 1600 South Eads St., #925-South, Arlington, Va. 22202
Walsh, Gerald M., 529 Northgate, Lindenhurst, Ill. 60046
Warner, James H., 11865 Old Columbia Pike, Silver Spring, Md. 20904
Wasserbauer, Damian Gilmary, 2525 Illinois Rd., Northbrook, Ill. 60062
Weiss, Laura S., 160 Columbia Hgts., #9C, Brooklyn, N.Y. 11201
Weiss, Philip M., 3245 Berth Dr., Baldwin, N.Y. 11510
Werner, Raymond J., 1850 McDowell Ct., Lawrenceville, Ga. 30244
Whitt, Stephen R., One Wren Ct., Sterling, Va. 22170
Wiggins, Michael D., 1935 N. Sheffield, #3, Chicago, Ill. 60614
Willgohs, Eric H., 214 Emerson St., Palo Alto, Calif. 94301
Williams, Harlan B., Jr., 4600 N. Washington, Blvd., #304, Arlington, Va. 22201
Wissing, William K., 317 Plainfield Ave., Berkeley Hgts., N.J. 07922
Wolff, Robert J., 123 Brookfield Dr., Macungie, Pa. 18062
Wong, James J., 47 Britton St., San Francisco, Calif. 94134
Wrigley, Barbara A., 2439 Chicago Ave., South, Minneapolis, Minn 55404
Wylie, Ruth L., 2632 Yorktown, #531, Houston, Tex. 77056
Yamasaki, Kazuyuki, 399 Stratford Ct., #201, Del Mar, Calif. 92014
Yamonaco, Lisa M., 407 Grant St., E. Rochester, N.Y. 14445
Yip, Alex L., 141-15 Hoover Ave., Jamaica, N.Y. 11435
Yun, Caroline J., 1507 N. Harrison St., Wilmington, Del. 19806
Zibas, Juras C., 674 Jasonway Ave., Columbus, Ohio 43214
Zimmerman, Paul W., Route 3 Box 8450 Dallas Rd., Richland, Wash. 99352

Status of PTO Services

The following is an update of the status of PTO services for Jan. 1991:

Service Item	FY 1991 Goal (Calendar Days)*	Monthly Average (Calendar Days)*
Filing Receipts:		
Patents	22	18
Trademarks	30	52
Patent/Trademark Copies:		
Special Window Coupons	24 Hours	16 Hours
Window Coupons	5	1
Mail Coupons	12	4
Letter Orders	16	18
Electronic Ordering Service (EOS)	11	2
Certified Copies:		
Trademark Registrations	21	19
Applications-As-Filed	17	6
File-Wrapper/Contents	N/A	14
Walk-up Certification	1	1
Patent Application Expedited	5	3
Trademark Search Library:		
Filing Pending Marks	23	34
Filing Reg. Certificates	Issue Date+2 days	On Goal
Filing Temp. Drawings	8	17
Assignments:		
Recording Patent-New Applications	20**	20
Recording Patent-Mail Room Recpts.	20	33
Return Patents-New Applications	34**	47
Return Patents-Mail Room Recpts.	34	49
Recording Trademarks	20	28
Returning Trademark Documents	34	39
Avg. Days from Issue Fee Payment to Issue Date	90-100	99
Issue Fee Receipts Mailed	4 weeks prior to Issue Date	On Time
Patent Copies Available	95% on Issue Date	94% on Issue Date
Trademark Copies Available	95% on Issue Date	97% on Issue Date

* Unless otherwise noted.
** Goal reflects the number of days from the date the filing receipt is mailed.

February 1, 1991

THERESA A. BRELSFORD
Assistant Commissioner
for Administration

PATENT NOTICES

Certificates of Correction For Week of February 26, 1991

D. 305,104	4,852,975	4,879,327	4,895,744
D. 306,254	4,853,489	4,879,331	4,896,232
4,514,818	4,855,347	4,880,492	4,896,656
4,633,416	4,859,457	4,883,420	4,896,810
4,633,481	4,861,702	4,883,849	4,897,268
4,634,548	4,862,205	4,883,963	4,897,452
4,636,021	4,862,633	4,883,968	4,898,406
4,689,295	4,862,731	4,885,615	4,898,662
4,756,020	4,864,360	4,885,708	4,898,884
4,761,684	4,864,760	4,885,918	4,899,088
4,762,534	4,865,117	4,886,024	4,899,096
4,767,447	4,865,431	4,886,331	4,899,316
4,776,948	4,865,476	4,887,315	4,900,315
4,778,567	4,865,872	4,887,366	4,901,082
4,788,005	4,866,934	4,887,650	4,901,174
4,801,829	4,867,061	4,887,683	4,901,779
4,809,271	4,867,816	4,887,818	4,902,275
4,814,994	4,867,825	4,888,246	4,902,553
4,817,643	4,867,875	4,888,269	4,902,620
4,818,770	4,868,145	4,888,812	4,902,640
4,818,846	4,868,469	4,891,742	4,902,793
4,820,302	4,870,353	4,892,182	4,903,285
4,822,590	4,870,469	4,892,214	4,903,702
4,822,678	4,871,646	4,892,234	4,904,741
4,823,839	4,871,709	4,892,530	4,905,303
4,828,355	4,872,737	4,892,740	4,905,322
4,829,667	4,873,556	4,892,892	4,905,678
4,832,036	4,873,680	4,893,063	4,906,168
4,832,968	4,874,245	4,893,155	4,907,324
4,834,909	4,874,643	4,893,980	4,909,671
4,845,513	4,874,807	4,894,362	4,963,695
4,846,283	4,875,927	4,894,510	4,971,654
4,847,419	4,876,015	4,894,694	
4,847,755	4,876,618	4,894,815	

SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

The following special boxes should be used only for their specified purpose. Address mail as follows:

Box _____
Commissioner of Patents and Trademarks
Washington, D.C. 20231

Box 3	Mail for the Office of personel for NFC
Box 4	Mail for the Assistant Commissioner for External Affairs and the Office of Legislation and Internal Affairs.
Box 5	"No Fee" mail related to tradeımarks.
Box 6	Mail for the Office of Procurement
Box 7	Reissue applications for patents involved in litigation and subsequently filed related papers.
Box 8	All papers for the Office of the Solicitor *except* communications relating to *pending litigation*; papers relating to pending litigation shall be mailed only to Office of the Solicitor, P.O. Box 15667, Arlington, Va. 22215
Box 9	Coupon orders for U.S. patent and trademark copies.
Box 10	Orders for certified copies of patent and trademark applications.
Box 11	Electronic Ordering Service (EOS).
Box 12	Contributions to the Examiner Education Program.
Box 13	Mail for the Employee and Labor Relations Division.
Box 14	Invoices directed to the Office of Finance.
Box 15	Mail for the Advisory Commission on Patent Law Reform.
Box 171	Vacancy Announcement Applications.
Box AF	Expedited procedure for processing amendments and other responses after final rejection.
Box Assignment	All assignment documents except those filed with new applications.
Box EEO	Mail for the Office of Equal Employment Programs.
Box FWC	Requests for File Wrapper Continuation Applications (under 37 CFR 1.62)
Box Interference	Communications relating to interferences and applications and patents involved in interference.
Box Issue Fee	All Communications following the receipt of a PTOL-85. "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments should be submitted in a separate envelope and not be sent to Box Issue Fee.
Box ITU	All intent to use documents, excluding the initial application and amendments to allege use.
Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
Box Non-Fee-Amendment	Non-fee amendments to patent applications. (Use Box AF for responses after final rejection).
Box OED	Mail for the Office of Enrollment and Discipline
Box PATENT APPLICATION	New patent application and associated papers and fees.
Box TRADEMARK	New trademark application and associated papers and APPLICATION fees.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Requests for Reexamination for *original* request papers *only*.
Box Sequence	Submission of diskette for biotechnical application.
Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent applications *prior* to the Office's standard notification (return postcard or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").

Reference Collection of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to libary, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 844-1747
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage: Z. J. Loussac Public Library	(907) 261-2916
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7607
Arkansas	Little Rock: Arkansas State Library	(501) 682-2053
California	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale Patent Clearinghouse	(408) 730-7290
Colorado	Denver Public Library	(303) 640-8847
Connecticut	New Haven: Science Park Library	(203) 786-5447
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami-Dade Public Library	(305) 375-2665
	Orlando: University of Central Florida Libraries	(407) 823-2562
	Tampa: Tampa Campus Library, University of South Florida	(813) 974-2726
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Hawaii	Honolulu: Hawaii State Public Library System	Not Yet Operational
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5659
Indiana	Indianapolis-Marion County Public Library	(317) 269-1741
Iowa	Des Moines: State Library of Iowa	(515) 281-4118
Kentucky	Louisville Free Public Library	(502) 561-8617
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 405-9157
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library and Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4281
Nebraska	Lincoln: Engineering Library, University of Nebraska-Lincoln	(402) 472-3411
Nevada	Reno: University of Nevada-Reno Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7782
	Piscataway: Library of Science and Medicine, Rutgers University	(201) 932-2895
New Mexico	Albuquerque: University of New Mexico General Library	(505) 277-4412
New York	Albany: New York State Library	(518) 473-4636
	Buffalo and Erie County Public Library	(716) 858-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D.H. Hill Library, North Carolina State University	(919) 737-3280
North Dakota	Grand Forks: Chester Fritz Library, University of North Dakota	Not Yet Operational
Ohio	Cincinnati and Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6175
	Toledo/Lucas County Public Library	(419) 259-5212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 744-7086
Oregon	Salem: Oregon State Library	(503) 378-4239
Pennsylvania	Philadelphia, The Free Library of	(215) 686-5331
	Pittsburgh, Carnegie Library of	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 455-8027
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2372

Reference Collection of U. S. Patents Available for Public Use in Patent Depository Libraries—(continued)

State	*Name of Library*	*Telephone Contact*
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Stevenson Science Library,Vanderbilt University	(615) 322-2775
Texas	Austin: McKinney Engineering Library, University of Texas at Austin	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext.2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: James Branch Cabell Library, Virginia Commonwealth University	(804) 367-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin Madison	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner

PATENT EXAMINING GROUPS	Phone Number Area Code 703
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director.	308-0661
ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director	308-1235
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP— 130 BARRY S. RICHMAN, Director	308-0651
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	308-2351
BIOTECHNOLOGY, GROUP 180—EDWARD E. KUBASIEWICZ, Director	308-0196
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. KELLY, Director	308-1782
SPECIAL LAWS ADMINISTRATION, GROUP 220—ROBERT E. GARRETT, Director	308-0511
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—PAUL SEWELL, Acting Director	308-0754
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX,Director	308-0771
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—JOSEPH J. ROLLA, Director.	308-0956
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP— 260 STEWART LEVY, Acting Director	308-0962
DESIGN, GROUP 290—ROBERT E. GARRETT, Director	308-0511
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	308-1113
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Director	308-1148
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	308-0858
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	308-0861
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350— A. L. SMITH, Director	308-0651

Expiration of patents: The patents within the range of numbers indicated below expire during January 1991 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,778,914 to 3,789,426 inclusive
Plant Patents ..... 3,413 to 3,462 inclusive

Notice for the Official Gazette

NOTICE OF INTENT OF IN VITRO INTERNATIONAL, INC., TO TERMINATE STATUS OF INTERNATIONAL DEPOSITARY AUTHORITY UNDER BUDAPEST TREATY

Since November 30, 1983, In Vitro International, Inc., ("IVI"), of Linthicum, Maryland, has been recognized as an international depositary authority under the Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure.

The Patent and Trademark Office has received a letter from Jacob B. Davis, Esq., of the law firm of Lechowicz & Davis, Glen Burnie, Maryland, dated January 4, 1991, which states, inter alia:

> [M]y client, In Vitro International, Inc. ("IVI") . . . is presently an international depository for microorganisms for the purposes of patent procedure.
>
> IVI would like to terminate its status as a depository and transfer all microorganisms which it is presently storing to another depository.

The Patent and Trademark Office has also received a second letter from Mr. Davis, dated January 14, 1991, which states, inter alia:

> My client has no funds to pay another depository for taking these microorganisms.

By letter dated February 8, 1991, the Patent and Trademark Office has notified the Director General of the World Intellectual Property Organization that "the United States has determined that it can no longer assure that IVI is able to continue to comply with the requirements of Article 6(2) of the Budapest Treaty with respect to any new deposits."

Currently under review are what steps should be taken to ensure that (1) guarantees made for IVI to acquire the status of an international depositary authority, and (2) its obligations under the Treaty and Regulations, are fulfilled to the fullest extent possible.

Questions may be directed to Michael K. Kirk, Assistant Commissioner for External Affairs, Box 4, Patent and Trademark Office, Washington, D.C. 20231; telephone (703) 557-3065.

February 8, 1991

HARRY F. MANBECK, JR.
Assistant Secretary and Commissioner
of Patents and Trademarks

REEXAMINATIONS

FEBRUARY 26, 1991

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,094,432 (1418th)
INDUSTRIAL DRUMS
Seymour Zilbert, Demarest, N.J., assignor to Bergen Barrel & Drum Co., Demarest, N.J.
Reexamination Request No. 90/001,878, Oct. 30, 1989.
Reexamination Certificate for Patent No. 4,094,432, issued Jun. 13, 1978, Ser. No. 767,137, Feb. 9, 1977.
Int. Cl.[5] B65D *1/12, 25/14*
U.S. Cl. 220—404

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–9** and **11–21** is confirmed.

Claim **10** was previously disclaimed.

1. An industrial drum constructed of synthetic resin material and capable of being gripped by a clamp of a drum-handling apparatus to facilitate mechanized handling of the drum, said drum comprising:

a generally tubular body member extending longitudinally between opposite ends and including a cylindrical side wall;

first and second end members, at least one of which is unitary with the tubular body member at one end thereof and closes said one end, the first and second members each including a circular end wall; and

at least one chime molded unitary with a member of the drum, the chime having a configuration including portions extending longitudinally and laterally outwardly for being gripped by the clamp of the drum-handling apparatus, the chime being annular and being located at the intersection of one of the end members and the body member so as to extend circumferentially around substantially the entire permimeter of said one of the end members, the longitudinally extending portion of the chime extending outwardly beyond the end wall of said one of the end members at said intersection and including an outer edge spaced longitudinally from said intersection, and the laterally extending portion of the chime extending laterally beyond the cylindrical side wall;

the tubular body member, and at least the one of the end members unitary therewith, being rotationally molded of a crosslinkable high density polyethylene resin having the ability to crosslink as the drum is molded.

B1 4,685,239 (1419th)
SPEAR POINT FOR FISHING SPEAR GUNS
Joseph B. LaMonica, Orange, Calif., assignor to Ann Runnels, Orange, Calif.
Reexamination Request No. 90/001,956, Mar. 13, 1990.
Reexamination Certificate for Patent No. 4,685,239, issued Aug. 11, 1987, Ser. No. 913,321, Sep. 30, 1986.
Int. Cl.[5] A01K *81/04*
U.S. Cl. 43—6

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–11** is confirmed.

1. A spear point for fishing spear guns which comprises:

a. a spear point shaft formed of a metal having a Rockwell hardness of at least 30, and distally bearing a pointed end;

b. an annular groove about the opposite end of said shaft from said pointed end; and

c. a spear point retainer sleeve formed of a softer steel than said shaft, and receiving in one end, said opposite end of said shaft, with an internally upset wall in said one end, opposite said annular groove and projecting therein, whereby said spear point is permanently secured to said spear point retainer sleeve.

B1 4,742,142 (1420th)
METHOD FOR PRODUCING SILICONE RUBBER POWDER
Koji Shimizu, and Mitsuo Hamada, both of Chiba, Japan, assignors to Toray Silicone Company, Ltd.
Reexamination Request No. 90/001,991, Apr. 9, 1990.
Reexamination Certificate for Patent No. 4,742,142, issued May 3, 1988, Ser. No. 34,368, Apr. 6, 1987.
Filed Apr. 9, 1990, Ser. No. 34,368
Claims priority, application Japan, Apr. 17, 1986, 61-89063
Int. Cl.[5] C08G *77/06*
U.S. Cl. 528—15

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1** to **5** are cancelled.

[1. A method for preparing a cured silicone rubber powder in the form of microfine particles, said method comprising (1) emulsifying a curable liquid silicone rubber composition in a mixture comprising water and a surfactant where said mixture is maintained at a temperature of from 0 to 25 degrees C., (2) curing the liquid silicone rubber into a powder by dispersing the resultant emulsion into water maintained at a temperature of at least 25 degrees C., and (3) isolating the resultant cured powder.**]**

REISSUES

FEBRUARY 26, 1991

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,542

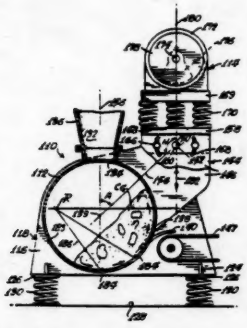
TUMBLING APPARATUS

Albert Musschoot, Barrington, Ill., assignor to General Kinematics Corporation, Barrington, Ill.

Original No. 4,709,507, dated Dec. 1, 1987, Ser. No. 922,062, Oct. 22, 1986. Continuation of Ser. No. 777,821, Sep. 19, 1985, abandoned, which is a continuation-in-part of Ser. No. 685,121, Dec. 21, 1984, abandoned. Application for reissue Apr. 17, 1990, Ser. No. 516,711

Int. Cl.[5] B24B *31/06*

U.S. Cl. 51—7 **14 Claims**



2. Vibratory apparatus comprising:

a container having a central axis and a material supporting surface;

mounting means for resiliently mounting the container for unconstrained vibratory movement relative to a mounting surface;

vibration generator means [for generating] *mounted on said container at a location offset on one side of the central axis of the container, said vibration generator means comprising shaft means disposed substantially parallel to the central axis, an eccentric weight means carried by the shaft means, motor means for rotating the shaft means to generate* vibratory force *having a component* along a linear path offset from the central axis [and from a center of gravity] of the container on [the] *said one*side of the [center of gravity spaced from the] central axis *of the container,*

[said vibration generator means being mounted on the container] *said container and said vibration generator means having a center of gravity offset from said central axis of the container,*

said vibratory forces vibrating each point on the material supporting surface along segments of circles, each segment having a center at a position *offset* from said central axis and from the center of gravity [on the side of the central axis spaced from the center of gravity] *and on the opposite side of the central axis of the container from said linear path of vibratory forces.*

Re. 33,543

Patent Not Issued For This Number

Re. 33,544

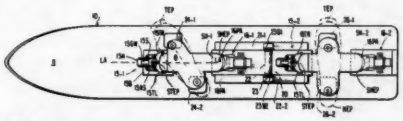
RELEASABLE BINDING SYSTEM FOR SNOWBOARDING

David Dennis, Virginia Beach, Va., assignor to Look Alpine Products, Inc., Highland Park, Ill.

Original No. 4,652,007, dated Mar. 24, 1987, Ser. No. 798,492, Nov. 15, 1985. Application for reissue Mar. 23, 1989, Ser. No. 331,325

Int. Cl.[5] A63C *9/00*

U.S. Cl. 280—618 **36 Claims**



25. Snowboard apparatus for supporting a rider having boots comprising,

a snowboard having a longitudinal axis,

releasable binding means secured to the forward and rearward ends, respectively, of said snowboard,

mounting plate means releasably engaged with said releasable binding means at the forward and rearward ends of said snowboard, respectively,

means for securing a rider's boots to said mounting plate means with the rider's trailing rear boot being substantially normal to said longitudinal axis and the rider's forward boot being secured to said snowboard at a predetermined angle relative to said longitudinal axis of said snowboard, and

means for causing a substantially simultaneous release of said mounting plate means and with both of said rider's boots being secured thereto, from said snowboard upon the release of one of said forward and rearward releasable binding means.

Re. 33,545

PREPARATION OF A HIGH MOLECULAR WEIGHT POLY(ARYLENE SULFIDE KETONE)

Roger G. Gaughan, Piscataway, N.J., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Original No. 4,716,212, dated Dec. 29, 1987, Ser. No. 905,615, Sep. 5, 1986. Application for reissue Jul. 14, 1989, Ser. No. 379,858

Int. Cl.[5] C08G *16/00, 75/16*

U.S. Cl. 528—226 **12 Claims**

1. A method for preparing a poly(arylene sulfide ketone) comprising:

contacting in a reaction mixture (a) at least one polyhalobenzophenone, employing about [1.004:1 to about 1.038:1 molar ratios] *0.004 to about 0.038 molar excess* of alkali metal hydrosulfide relative to said polyhalobenzophenone, and at least one of (b) or (c), wherein (b) is at least one alkali metal sulfide and at least one alkali metal hydrosulfide, and (c) is at least one alkali metal hydroxide and at least one alkali metal hydrosulfide, under polymerization conditions effective for producing the poly(arylene sulfide ketone);

PLANT PATENTS

GRANTED FEBRUARY 26, 1991

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,454

MINIATURE ROSE PLANT NAMED 'MICHOME'

Michael C. Williams, P.O. Box 203, Cross Hill, S.C. 29332

Filed Jan. 2, 1990, Ser. No. 459,468

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—9 1 Claim

1. A new and distinct variety of rose plant of the miniature rose class, substantially as herein shown and described, characterized particularly by high-centered blooms of light rose pink coloring, with firm, thick petals, borne freely on an upright plant with glossy dark green new foliage and semi-glossy darker green old foliage, said plant being easy to propagate from cuttings, and said blooms being long-lasting on the plant and as cut flowers.

7,455

ROSE PLANT NAMED DEVLOREN

Stanley G. Marciel, Aptos, Calif., assignor to DeVor Nurseries, Inc., Watsonville, Calif.

Filed Jul. 24, 1989, Ser. No. 383,614

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—18 1 Claim

1. The new and distinct variety of greenhouse rose plant substantially as herein shown and described, characterized by its profuse and continuous production of flowers of large size and scarlet to crimson coloration.

7,456

MAGNOLIA TREE NAMED BUTTERFLIES

Philip G. Savage, and Roy G. Klehm, both of S. Barrington, Ill., assignors to Justine B. Savage and Sarah L. Klehm, both of South Barrington, Ill.

Filed Nov. 9, 1989, Ser. No. 433,960

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—51 1 Claim

1. A new and distinct cultivar of magnolia tree named Butterflies, as illustrated and described.

7,457

AZALEA HYBRID 'JESSICA DAWN'

Rose M. Mossholder, Fallbrook, Calif., assignor to Hines Nurseries Inc., Irvine, Calif.

Filed May 12, 1989, Ser. No. 351,138

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—56 1 Claim

1. A new variety of hybrid evergreen azalea plant as described and illustrated, characterized by a compact horizontally spreading form with ascending branches, a uniform, strong and vigorous rooting habit, and blooms which appear in clusters of two to four, is a mid-season bloomer (early March–April) in Irvine, Calif., the blooms having a diameter of about 7.6 to 8.9 cm, a double hose-in-hose open funnel shaped form with petaloid stamens, and petals having an upper surface marbled in four shades of pink.

7,458

KALANCHOE PLANT NAMED VANGUARD

Margaret M. Fleming, Soquel, Calif., assignor to The Plant Company, Soquel, Calif.

Filed Oct. 16, 1989, Ser. No. 422,089

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—68 1 Claim

1. A new and distinct plant of Kalanchoe named Vanguard, as described and illustrated.

7,459

CARNATION NAMED HILSTEFA

Jan J. Hilverda, Aalsmeer, Netherlands, assignor to Hilverda b.v., Netherlands

Filed Jan. 23, 1989, Ser. No. 299,773

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—71 1 Claim

1. The new and distinct spray carnation cultivar substantially as herein shown and described, characterized by its relatively small flowers each having about thirty to thirty-four petals, the inner side of which have a dark pink coloration, the flowers being produced profusely on long, rigid and erect stems of a tall, strong plant having a vigorous and upright growth habit and abundant foliage.

PATENTS

GRANTED FEB. 26, 1991

ERRATA

For CLASS	See PATENT NO.
073-116	4,995,139
016-357	4,995,143
016-261	4,995,144
028-119	4,995,150
026-069	4,995,151
024-129	4,995,152
030-116	4,995,153
030-147	4,995,154
030-041	4,995,155
042-050	4,995,179
042-070	4,995,180
522-097	4,995,206
081-003	4,995,295
081-057	4,995,296
081-126	4,995,297
082-127	4,995,298
081-176	4,995,299
082-012	4,995,300
051-219	4,995,301
114-301	4,995,326
118-410	4,995,338
118-410	4,995,339
118-715	4,995,340
118-723	4,995,341
132-324	4,995,364
196-046	4,995,495
193-032	4,995,499
192-107	4,995,500
222-132	4,995,540
052-770	4,995,605
301-005	4,995,679
350-096	4,995,728
405-043	4,995,759
410-010	4,995,775
410-100	4,995,776
411-361	4,995,777

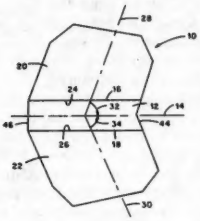
440-074	4,995,843
464-144	4,995,853
604-008	4,995,856
600-016	4,995,857
475-298	4,995,861
475-086	4,995,862
429-153	4,996,128
429-194	4,996,129
564-216	4,996,322
377-060	4,996,686

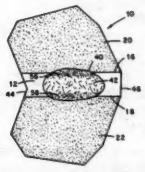
PATENTS

GRANTED FEBRUARY 26, 1991

GENERAL AND MECHANICAL

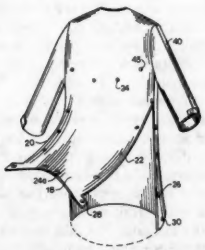
4,995,114
UNIVERSAL EYE PATCH
James A. Price, Jr., 26 Windwood Hill, Jackson, Tenn. 38305
Filed Jan. 17, 1990, Ser. No. 466,246
Int. Cl.[5] A61F *9/00, 13/12*
U.S. Cl. 2—15 **14 Claims**





1. An eye patch comprising a relatively non-yielding central portion having a length dimension, and first and second wing portions, each having a length dimension, connected to and extending from said central portion on opposite sides of said length dimension along said central portion, said first and second wing portions each having an outer edge portion which defines an included angle of between about 65 and 75 degrees with a respective elongated edge of said central portion whereby when said eye patch is disposed in covering relationship to the eye, said central portion extends generally horizontally across the opening of the eye orbit and said wing portions extend angularly outwardly away from the nasal region to anchor the patch across the opening of the eye orbit.

4,995,115
GARMENT FOR A WHEELCHAIR OCCUPANT
Janice Ellis, 1221 Morton Ave., Aurora, Ill. 60506
Filed Mar. 12, 1990, Ser. No. 491,722
Int. Cl.[5] A41D *13/12, 27/10, 10/00*
U.S. Cl. 2—69 **8 Claims**

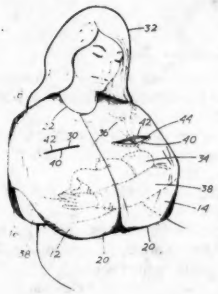


1. A garment for wear by a person while occupying a wheelchair, said garment comprising:

gown apparel including a body portion and sleeve portions, said gown further comprising selectively closable slits positioned along each side of said gown and thereby defining a back panel thereto moveable between an upper and lower position; and

means for fastening the lower edge of said back panel to the back of said gown when saaid back panel is raised to said upper position.

4,995,116
ARMS FREE PRIVACY CAPE FOR BREAST FEEDING INFANTS
Matthew R. Beauchamp, and Maryellen S. Beauchamp, both of 2056 Lincoln Rd., Yuba City, Calif. 95991
Filed Nov. 6, 1989, Ser. No. 432,376
Int. Cl.[5] A41D *1/26, 1/22*
U.S. Cl. 2—104 **4 Claims**



1. An arms free nursing cape worn over both a mother and a breast feeding infant under said nursing cape to provide a privacy covering for the mother and infant in a public place, said nursing cape being a covering folded along a shoulder section and draped over the mother's shoulders with said covering continuing downwardly from said shoulder section, the downward continuation of said covering divided into two substantially equal halves, there being a neck opening generally centrally through said nursing cape for the mother's neck, said two substantially equal halves being a front half and a back half, said front half divided into two front panels separated by a frontal opening extending through said neck opening and downwards from said neck opening through a bottom edge of said front half, said frontal opening releasably fastened closed by a fastening means, said shoulder section extending on both sides of said neck opening sufficiently to provide covering over the mother's arms, said front half of said nursing cape being of sufficient length to provide covering for the breast feeding infant, said two front panels each having one short transverse surveillance opening positioned over the breasts of the mother providing an opening to allow the mother to view the infant breast feeding under said front panels, said surveillance openings each having fastening means thereon adapted to provide releasable closing of said surveillance opening, said surveillance openings being openable in a generally horizontal plane limiting viewing therethrough downwardly by the mother wearing said nursing cape, stiffening means affixed to said nursing cape around said surveillance openings adapted to maintain said surveillance openings sufficiently opened for viewing by the mother of the breast feeding infant, said nursing cape fabricated of a pliable light weight material being foldable for storage in a purse or in a diaper bag.

4,995,117

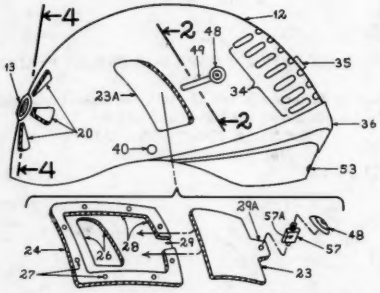
(AIRLOCK) BICYCLE HELMENT WITH ADJUSTABLE VENTILATION SYSTEMS AND ACCESSORIES

James A. Mirage, 50 W. 77 St., Dept. #10G, New York, N.Y. 10024, assignor to James A. Mirage, New York, N.Y.

Continuation-in-part of Ser. No. 270,823, Nov. 4, 1988, abandoned. This application Nov. 16, 1989, Ser. No. 437,222

Int. Cl.[5] **A42B** *1/06*

U.S. Cl. 2—410 **22 Claims**



1. A helmet comprising an outer helmet shell and a buffer liner attached to the inner surface of said outer helmet shell, said helmet further comprising,

(a) front-facing ventilation openings arranged in a circular, daisie-like pattern, at a front of said outer helmet shell, as a means for ventilation,

(b) and singular vent openings on a left and a right side, of said outer helmet shell,

(c) and rearward facing exhaust openings comprising a plurality of apertures arranged in a louver-like pattern, at a rear of said outer helmet shell,

(d) chin straps attached to said helmet at the sides and at the rear of said outer helmet shell for the purpose of maintaining said helmet on a wearer's head,

(e) said liner being provided with openings corresponding to the openings of said outer helmet shell for ease of airflow to a wearer's head.

4,995,118

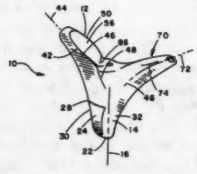
PRE-TIED NECKTIE SET

Anthony E. Paduano, Sr., 20 Irvington St., New Haven, Conn. 06513

Filed May 23, 1990, Ser. No. 527,343

Int. Cl.[5] **A41D** *25/00*

U.S. Cl. 2—150 **15 Claims**



1. A support element for use in a neckwear combination comprising:

a monolithic Y-shaped body having

(1) a cylindrical central portion which includes

(a) a longitudinal centerline,

(b) a front surface portion,

(c) a rear surface portion,

(d) a lower tip,

(e) an upper area spaced from said lower tip,

(f) a C-shaped slot extending along said central portion longitudinal centerline from said lower tip adjacent to said rear surface portion to adjacent to said upper area in said front surface portion, said slot being concave,

(g) side surface portions connecting said rear surface portion to said front surface portion, and

(h) all of said surface portions being curved around said longitudinal centerline, with said side surface portions having similar curvatures which are different from the curvature of said front surface portion which is different from the curvature of said rear surface portion, with said side surface portions being planar adjacent to said slot,

(2) a wing section extending from said body central portion upper area and including

(a) a first wing extending at a skewed angle with respect to said central portion longitudinal centerline and extending upwardly from said lower tip and which includes

(i) a longitudinal axis which extends at an angle that is skewed with respect to said central body longitudinal centerline and which is in a plane different from a plane containing said central body longitudinal centerline,

(ii) an outer tip,

(iii) a front surface which is located adjacent to said central body portion front surface and which is curved about said first wing longitudinal centerline, said first wing front surface merging with said central body front surface and having a curvature that is different from the curvature of said central body front surface curvature and intersecting said central body front surface to form a rounded shoulder which extends at a skewed angle with respect to said central body longitudinal centerline,

(iv) a rear surface which has a curvature about said first wing longitudinal centerline, said first wing rear surface being in a plane that is different from a plane containing said central body rear surface,

(v) a top surface which slopes downwardly toward said central body lower tip from said first wing front surface to said first wing rear surface,

(vi) a concave dimple defined in said first wing outer tip,

(vii) a concave groove defined in said first wing top surface from adjacent to said outer tip and extending along said first wing longitudinal centerline,

(b) a second wing extending at a skewed angle with respect to said central portion longitudinal centerline and extending upwardly from said lower tip and which includes

(i) a longitudinal axis which extends at an angle that is skewed with respect to said central body longitudinal centerline and which is in a plane different from a plane containing said central body longitudinal centerline and which is skewed with respect to said first wing longitudinal centerline and in a plane that is different from the plane containing said first wing longitudinal centerline,

(ii) an outer tip,

(iii) a front surface which is located adjacent to said central body portion front surface and which is curved about said second wing longitudinal centerline, said second wing front surface merging with said central body front surface and having a curvature that is different from the curvature of said central body front surface curvature and different from the curvature of said first wing front surface and intersecting said central body front surface at said rounded shoulder,

(iv) a rear surface which has a curvature about said second wing longitudinal centerline, said second wing rear surface being in a plane that is different

from a plane containing said central body rear surface and forming a continuation of said first wing rear surface,

(v) a top surface which slopes downwardly toward said central body lower tip from said second wing front surface to said second wing rear surface, said second wing top surface having a curvature which is different from said first wing top surface curvature and intersecting said first wing top surface to form a top surface shoulder which extends at a skewed angle with respect to said rounded shoulder and which is located in a plane that is different from a plane containing said rounded shoulder,

(vi) a concave dimple defined in said second wing outer tip,

(vii) a concave groove defined in said second wing top surface from adjacent to said second wing outer tip and extending along said second wing longitudinal centerline.

4,995,119

PROTECTIVE GLOVE OR GLOVE LINERS

Doris Codkind, 10 Houston Ave., Monroe, N.Y. 10950

Filed Nov. 18, 1988, Ser. No. 273,450
Int. Cl.[5] A41D *19/00*
U.S. Cl. 2—163 13 Claims

13. A glove for protecting long fingernails comprising

an outer protective layer in the form of a flexible polymeric glove having a plurality of finger stalls of a length sufficient to accommodate fingernails which extend past the distal end of the fingertip, the outer protective layer having an inner surface and an outer surface;

a least one flexible polymeric finger pad of a dome-shaped and curved configuration and of a length at the distal end of the fingertip sufficient to accommodate fingernails which extend past the distal end of the fingertip, installed in a finger stall, said pad being substantially impenetrable to sharp objects, the finger pad having an outer surface, an inner surface and a proximal length substantially less than the length of the finger stall in which the pad is installed, the outer surface of the pad being adhesively secured to the inner surface of the outer protective layer; and optionally

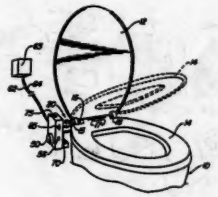
an inner protective layer in the form of a flexible polymeric glove having a plurality of finger stalls of a length sufficient to accommodate fingernails which extend past the distal end of the fingertip, the inner layer having an inner surface and an outer surface, the outer surface of the inner protective layer being adhesively secured to the inner surface of the flexible polymeric finger pad and in abutment with the inner surface of the outer protective layer.

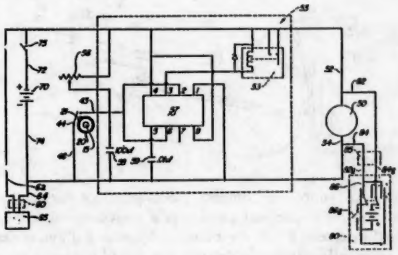
4,995,120

TOILET SEAT CLOSING DEVICE

Benny L. Tager, Rte. 5, Box 7013, Quinlan, Tex. 75474

Filed Aug. 16, 1989, Ser. No. 394,576
Int. Cl.[5] A47K *13/10*
U.S. Cl. 4—251 12 Claims





1. A toilet seat connectable to a toilet bowl comprising: a toilet seat; means pivotally securing said toilet seat to a toilet bowl, said means being rotatable to move said toilet seat from a generally horizontal plane to a generally vertical plane; a motor; ratchet means drivingly connecting said motor to said toilet seat, said ratchet means being adapted to permit said toilet seat to be rotated manually from a generally horizontal plane to a generally vertical plane; and timer means associated with said motor to energize said motor to move said toilet seat from a vertical plane toward a horizontal plane upon expiration of a predetermined time period after said seat has been raised.

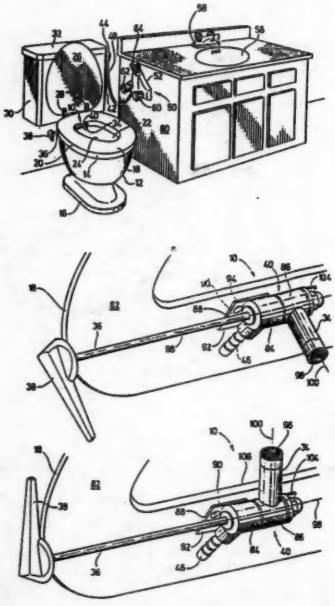
11. A toilet seat connectable to a toilet bowl comprising: a toilet seat; a primary power supply a remove power supply; a rod secured to said toilet seat; means pivotally securing said rod to a toilet bowl, said rod being rotatable to move said toilet seat from a generally horizontal plane to a generally vertical plane; a motor; means connecting said primary power supply and said remote power supply to said motor, said remote power supply being adapted for driving said motor in opposite directions to rotate said rod in opposite directions to rotate said seat between generally horizontal and vertical planes in the event of failure of said primary power source; and ratchet means connecting said motor to said rod, said ratchet means being adapted to permit said toilet seat to be rotated manually from a generally horizontal plane to a generally vertical plane.

4,995,121

COMPACT BIDET ASSEMBLY WITH EXTERNAL ADJUSTMENT

Douglas J. Barker, 1280 Sunshine La., Southlake, Tex. 76092

Filed Sep. 22, 1989, Ser. No. 410,956
Int. Cl.[5] A47K *3/22, 3/20;* A61H *35/00*
U.S. Cl. 4—443 8 Claims



1. An improved compact bidet assembly for inobtrusive attachment to the seat portion of a conventional toilet to be used by a seated user for personal hygiene without otherwise significantly affecting appearance or use of the toilet, comprising a mounting spacer for attachment to the undersurface of a toilet seat adjacent the rearmost portion of the seat opening; a fixed element having a fluid inlet mounted on a portion of the mounting spacer; a rotatable element in fluid tight connection with the fixed element, having a fluid directing nozzle being rotatable with the rotatable element in response to a control rod extending from a portion of the rotatable element to at least the outer edge of the seat; a passageway in fluid communication between the fluid inlet and the fluid directing nozzle;

said mounting spacer having a flat mounting surface and a spacing surface, the fixed element being mounted on the spacing surface and providing support for the rotatable element, the rotatable element being spaced apart from the undersurface of the seat when the mounting spacer is positioned on the seat and mounted for use;

said control rod having a central axis which coincides with a central axis of the fixed element and a central axis of the rotatable element,

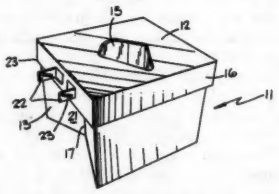
wherein the control rod passes through the fixed element and the rotatable element and includes means for rotatably fluid sealing the passageway in the fixed element; the control rod further including a locking surface which engages a corresponding locking surface formed in a wall of the rotatable element, a means for sealing the rotatable element from leakage and, means for drawing and holding the fixed and rotatable elements together in fluid tight engagement.

4,995,122

PORTABLE COMMODE

Elmer J. Mohnhaupt, P.O. Box 705, Evergreen, Colo. 80439

Filed Jul. 5, 1988, Ser. No. 214,947
Int. Cl.[5] A47K *11/02*
U.S. Cl. 4—483 5 Claims



1. A portable commode made of a biodegradeable material and having an operational mode and a transport mode comprising:

an outer base support configured as a rectangle with two opposing walls bent inwardly at preformed creases to form a bow-tie shape, that can be bent further at said preformed creases until almost flat when in the transport mode;

an inner base support that fits within said outer base, that can be folded almost flat when in the transport mode;

an upper seat part of lid-like construction which includes a top seat portion having an opening therein and downwardly extending edges, that fits over the top of said inner and outer base supports when in the operational mode;

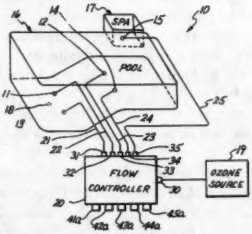
said inner base support is configured as a rectangle with preformed creases in two opposing walls, so that said opposing walls may bend inwardly and outwardly, although tending to bend inwardly; said inner base support comprises an upper portion and a bottom portion and has first means for attachment on the upper portion at two opposite corners of said rectangle, said outer base support comprises an upper portion and a bottom portion and has second means for attachment on the upper portion in the center of the two walls adjacent to said opposing walls, and when in the operational configuration, said first means cooperate with said second means to hold the support bases together in a fixed physical relationship..

4,995,123

OZONE DISPERSION SYSTEM

Donald W. Kern, 5290 Orcutt Rd., San Luis Obispo, Calif. 93401

Filed Nov. 9, 1989, Ser. No. 434,919
Int. Cl.[5] E04H *3/20;* C02F *1/78*
U.S. Cl. 4—490 12 Claims



5. A system for sanitizing swimming pool water with ozone, comprising:

a swimming pool;

a source of ozone;

a plurality of ozone-injection ports at spaced-apart locations in the swimming pool;

means for communicating ozone from the source of ozone to each of the ozone-injection ports; and

flow control means for controlling the rate at which the ozone flows from the source of ozone to each of the ozone-injection ports;

the plurality of ozone-injection ports including at least a first ozone-injection port located at a first elevation and a second ozone-injection port located at a second elevation that is different from the first elevation;

the flow control means enabling a user to separately adjust the rate at which the ozone flows from the source to each of the first and second ozone-injection ports in order to compensate for differences in hydrostatic pressure at the first and second ozone-injection ports; and

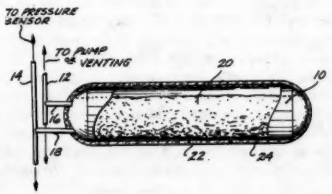
the means for communicating ozone including a manifold and the flow control means includes a plurality of manually adjustable valves carried by the manifold for separately controlling the rate at which the ozone flows from the source of ozone to each of the ozone-injection ports, respectively.

4,995,124

CONSTANT PRESSURE LOAD BEARING AIR CHAMBER

Wilbur S. Wridge, Jr., Portland, Oreg., and Lloyd D. Everard, Kent, Wash., assignors to Sustena, Inc., Kent, Wash.

Filed Oct. 20, 1988, Ser. No. 261,027
Int. Cl.[5] A47C *27/08*
U.S. Cl. 5—450 **25 Claims**



1. An air mattress capable of supporting a load comprising:

(a) an inflatable membrane defining a chamber having a chamber air pressure;

(b) load supporting material disposed in said chamber;

(c) a selectively actuatable air pump in fluid communication with said chamber to supply pressurized air thereto;

(d) a selectively openable vent valve in fluid communication with said chamber;

(e) a pressure sensor in fluid communication with said chamber for generating a sensed pressure signal representative of said chamber air pressure;

(f) a pressure selector generating a desired pressure signal representative of a desired chamber air pressure; and

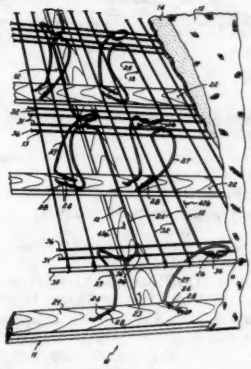
(g) a control means connected to said air pump and said vent valve and receiving said sensed pressure signal and said desired pressure signal for maintaining said chamber at approximately said desired chamber air pressure whereby when the load on said membrane causes said chamber air pressure to rise above said desired air pressure, said vent valve is opened until at least a portion of the load is supported by said load supporting material so that said chamber air pressure falls to approximately said desired chamber air pressure.

4,995,125

BEDDING BOX SPRING HAVING SNAP-FIT MODULAR ELEMENTS

Timothy D. Dennison, Carthage, Mo., assignor to Leggett & Platt, Incoporated, Carthage, Mo.

Filed Aug. 7, 1990, Ser. No. 564,055
Int. Cl.[5] A47C *23/04*
U.S. Cl. 5—247 **9 Claims**



1. A box spring for supporting a bedding mattress, said box spring comprising

a rectangular base frame, said base frame comprising a pair of opposed side members, a pair of opposed end members, and transverse slats extending between said side members,

a plurality of modular spring elements mounted atop said base frame, each of said modular spring elements comprising a horizontal straight center section terminating in curved horizontal end sections, at least some curved end sections having spring sections extending vertically downwardly therefrom, said modular elements being arranged in parallel rows with adjacent elements of each row being spaced apart at said curved end sections,

a wire grid mounted atop said modular elements, said wire grid comprising a rectangular border wire and a plurality of pairs of wires extending between opposed sides of said border wire, each wire of said pairs of wires having a plurality of upwardly, open offset hooks formed therein, said offset hooks of one wire of each pair of wires being opposed to said offset hooks of the other wire of the same pair, and each pair of wires having a plurality of modular spring elements extending therebetween with the curved end sections of said modular elements being snap-fitted into said offset hooks such that said curved end sections of said modular elements extend beneath said grid wires on opposite sides of each of said offset hooks and are located above the open section of each of said offset hooks,

a fabric pad overlying said wire grid, and

an upholstered covering encasing said base frame, said modular elements, said wire grid, and said fabric pad.

4,995,126

CUSHION WITH HEATING PAD

Toshihiko Matsuda, Mino, Japan, assignor to Marumanji Sangyo Co., Ltd., Osaka, Japan

Filed Apr. 23, 1990, Ser. No. 512,747
Claims priority, application Japan, May 18, 1989, 1-57656[U]
Int. Cl.[5] A47C *21/04*; A61F *7/08*
U.S. Cl. 5—421 **2 Claims**

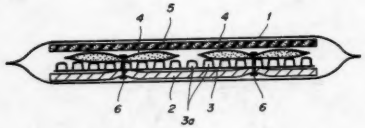
1. A cushion comprising:

a ventilated outer bag (1) having a lower side and an upper side adapted to be contacted by the body of a user, said

outer bag having an interior containing, in successive layers arranged between said lower and upper sides,

mat means (2) positioned adjacent to said lower side;

sheet means (3) disposed above said mat means, said sheet means having on its upper side at least one recessed air passage;



disposable heat pad means (4) at the upper side of said sheet means (3);

cushion means (5) between said heat pad means (4) and said upper side of said outer bag; and

fastener means (6) for interconnecting said mat means (2), sheet means (3) and heat pad means (4).

4,995,127

BED PAD, AN AUTOMOBILE SEAT PAD, A PILLOW OR A SIMILAR CUSHIONLIKE ITEM

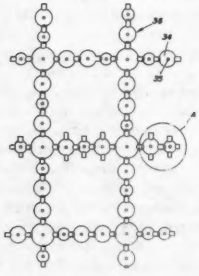
Jitsuo Inagaki, 71, Aza Kamiyashiki, Itsusikicho Hazugun, Aichi, Japan 444-04

Division of Ser. No. 454,020, Dec. 20, 1989, Pat. No. 4,945,591, which is a division of Ser. No. 294,566, Nov. 2, 1988, Pat. No. 4,924,541. This application Mar. 12, 1990, Ser. No. 491,835

Claims priority, application PCT Int'l Appl.; Mar. 10, 1987, PCT/JP87/00146

Int. Cl.[5] A47C *27/00*

U.S. Cl. 5—461 **9 Claims**



1. An item for use as a bed pad, an automobile seat pad, a pillow, a cushion or the like, said item comprising an enclosure containing a large number of hollow and spherical stuffing elements of synthetic resin each having an airing hole therein, said stuffing elements being connected together vertically and horizontally in order to increase the airing function of the item.

4,995,128

ELECTRICIAN'S COMBINATION TOOL

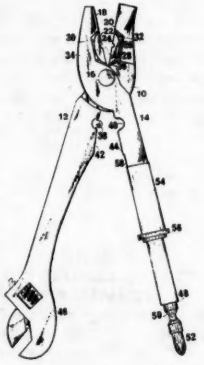
Robert D. Montgomery, 1685 W. 12th, Reno, Nev. 89503, and Harold L. Hull, 401 Canyon Way, Sparks, Nev. 89434

Filed Jan. 22, 1990, Ser. No. 468,135

Int. Cl.[5] B25B *7/22*

U.S. Cl. 7—127 **11 Claims**

1. A combination tool comprising; a first and second plier member having a jaw section, said jaw sections having cutting edges, said cutting edges being aligned so that they coact to cut an object placed between them when said jaw sections are pivotally displaced toward and away from each other, said cutting edges having at least one notch, said notches being aligned so that they engage a wire placed between them when said jaw sections are pivotable displaced toward and away from each other, a first and second handle section, said handle sections having a first and second position, said plier members being pivotably attached together to allow said jaw section to be pivotably displaced toward and away from each other by moving said first and second handle sections to and away from each other, said handle sections being substantially parallel to each other when said handle sections are in a first closed position, said handle sections being at substantially a ninety degree angle to each other when said handle section are in said second open position, a gripping area, said gripping area being an



independent cylinder surround a section of said first handle, said cylinder cooperating with said first handle section to allow said cylinder to turn freely on said first handle section, said gripping area cooperating with said first handle section to allow the thumb and fingers of a user to grasp said gripping area of said first handle section of said first plier member to put substantially pressure on the distal end of said first handle section, said first handle section having on it's distal end means to receive and hold releasable attached tips, said second plier member having on it's distal end a crescent wrench, said first and second handle sections having means between them to grasp a wire, and said first and second handle sections having means between them to crimp an electrical connector.

4,995,129

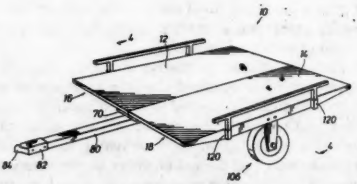
COLLAPSIBLE TRAILER/RAMP ASSEMBLY

Mathis P. Comardo, 5301 Nolda St., Houston, Tex. 77007

Continuation of Ser. No. 179,628, Apr. 8, 1988, abandoned. This application Jan. 30, 1989, Ser. No. 302,924

Int. Cl.[5] B65G *67/02*

U.S. Cl. 14—71.1 **20 Claims**



1. A collapsible trailer/ramp assembly comprising:

(a) a pair of generally rectangular deck plates having a plurality of end and side flanges extending downwardly therefrom and a plurality of structural members including transverse members extending downwardly from the

under side thereof and cooperating with said deck plates to form a pair of deck sections of efficient structural integrity, two of said side flanges of said deck plates being pivotally interconnected by hinge member at the lower portions thereof and forming a longitudinal pivot axis forming a longitudinal centerline of said trailer/ramp assembly and permitting said deck sections to form a compartmentalized box-like enclosure when folded about said longitudinal pivot axis, said deck sections when unfolded to substantially coextensive relation, forming a ramp for supporting objects moving thereon, said structural members defining opposed walls disposed in normal relation with said deck plates and forming wheel receptacle means and cooperating in the folded condition of said deck sections to form storage receptacle means for trailer parts, said opposed walls having pin receiving apertures formed therein;

(b) a pair of wheel assemblies each having a bifurcated wheel support providing wheel support legs supporting an axle and wheel and having close fitting relation between said opposed walls and thus being removably received in substantially immovable relation by said wheel receptacle means;

(c) a plurality of transverse structural bridge members being removably secured in assembly with said transverse members of said deck sections at spaced locations along the length thereof and in transverse relation to said longitudinal centerline and securing said deck sections to prevent folding thereof;

(d) drawbar means being removably received by said deck sections in parallel relation with said longitudinal centerline and providing hitch receiving means for connection to the trailer hitch of a tow vehicle; and

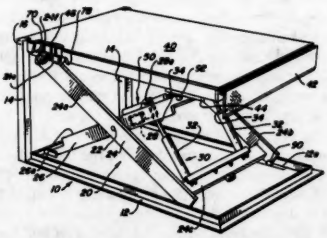
(e) a plurality of locking pins releasably securing said wheel assemblies, said transverse structural bridge members and said drawbar means to said deck sections.

4,995,130

DOCK LEVELER LIFT ASSEMBLY AND METHOD FOR OPERATION

Norbert Hahn, Franklin, Wis., and Robert W. Naegeli, Edmond, Okla., assignors to Rite-Hite Corporation, Milwaukee, Wis.

Filed Sep. 25, 1989, Ser. No. 411,866
Int. Cl.[5] E01D *1/00*
U.S. Cl. 14—71.3 **11 Claims**



1. A dock leveler lift assembly for facilitating loading and unloading operations from a substantially horizontal platform surface of a loading dock, said assembly comprising

a frame having a base section, and a rear elevated portion adapted to be disposed adjacent to but beneath the platform surface;

a first means mountable on the base section and selectively movable between a predetermined lowered position, a predetermined elevated position, and a predetermined intermediate position;

a first actuating means connected to the first means for raising and lowering said first means;

a deck releasably mountable on said first means and movable between a lowered position and a raised position, the latter being substantially coplanar with the platform surface;

a lip hingedly connected to a front edge portion of the deck and movable between a depending position and an outwardly extended cantilevered position;

a second means disposed proximate a rear edge portion of the deck and releasably retaining the deck rear edge portion pivotally attached to the frame rear elevated portion;

a second actuating means mounted on said first means having a distal end operatively connected to the deck for affecting pivotal movement thereof between an upwardly inclined position and a lowered declining position,

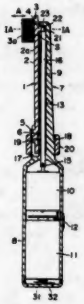
whereby the lowering of the first means to the predetermined intermediate position allows pivotal movement of the deck to the lowered declining position when the second means has pivotally attached the rear edge portion of the deck to the frame rear elevated portion.

4,995,131

ELECTRIC TOOTHBRUSH

Hiroshi Takeda, 1-3-15, Tomigaya, Shibuya-ku, Tokyo, Japan

Filed Nov. 20, 1989, Ser. No. 438,118
Claims priority, application Japan, Nov. 25, 1988, 63-297822
Int. Cl.[5] A46B *13/02*
U.S. Cl. 15—22.1 **4 Claims**



1. An electric toothbrush comprising:

a holder having a tubular body, an electrical driving device in said tubular body, an arm having a longitudinal hole and extending from said tubular body, and a rotary shaft connected to said electrical driving device and extending through said longitudinal hole,

a toothbrush member having a longitudinal lever, a head portion at an end of said lever, a tail portion at the other end thereof, and brush-fillings implanted in a portion of said head portion,

transducer means for converting a rotational movement of said rotary shaft to a reciprocal, linear movement to said head portion so that said head portion is reciprocally moved at right angles relative to a longitudinal direction of said rotary shaft, and

fixing means for releasably holding said tail portion of said lever of the toothbrush member to said arm of said holder in a cantilever configuration.

4,995,132

GUIDING DEVICE FOR SPIRAL PIPE CLEANERS

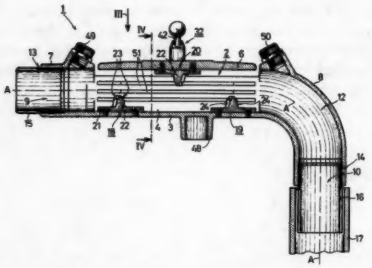
Reiner Seitz, Helsa-Eschenstruth, Fed. Rep. of Germany, assignor to ROWO Rohr und Kanal Reinigungsgeraete GmbH, Hessisch-Lichtenau, Fed. Rep. of Germany

Filed Jun. 28, 1989, Ser. No. 372,863

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1988, 3821667

Int. Cl.[5] B08B *9/02*

U.S. Cl. 15—104.33 18 Claims



1. Guiding device for a spiral pipe cleaner which is rotated about its axis to thread it through said guiding device, said pipe cleaner being of the type comprising a plurality of coil sections fixed to coupling elements which are connected to space adjacent coil sections apart by a distance D, said coil sections having a common coil axis and a common circumference, each coil section comprising a plurality of turns separated by interspaces, said guiding device comprising

a guide housing with opposed openings for receiving said pipe cleaner axially therethrough, said housing having engaging jaws fixed therein which are received in the interspaces and are aligned to positively engage the turns, said jaws being distributed in an axial succession in the housing about the circumference of the pipe cleaner, successive engaging jaws being circumferentially spaced apart, the axial distance between successive engaging jaws being greater than half of the distance D.

4,995,133

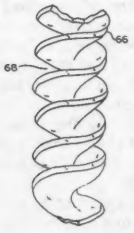
MOP HEAD COMPRISING CAPACITIVE WEB ELEMENTS, AND METHOD OF MAKING THE SAME

Robert D. Newell, 429 N. Main St., Roxboro, N.C. 27973

Continuation-in-part of Ser. No. 189,484, May 2, 1988, Pat. No. 4,923,738. This application Apr. 5, 1990, Ser. No. 505,062

Int. Cl.[5] A47L *13/20*

U.S. Cl. 15—229.001 27 Claims



1. A mop head comprising a unitary array of plural web elements, comprising elongate web element strands having involutions therein formed by differential stressing of elongate web element strips to a sufficient extent to permanently impart said involutions thereto and form said elongate web element strands therefrom, with said strands having a reduced transverse dimension relative to said elongate web element strips.

4,995,134

MOP CONNECTOR

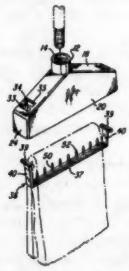
Patrick H. Monahan, 239 S. Pine St., Arcola, Ill. 61910

Continuation of Ser. No. 95,323, Sep. 10, 1987, abandoned. This application Jun. 30, 1989, Ser. No. 374,242

Claims priority, application New Zealand, Aug. 31, 1988, 225998; Australia, Sep. 6, 1988, 21887/88

Int. Cl.[5] A47L *13/258*

U.S. Cl. 15—151 14 Claims



1. Apparatus for connecting a mop to a handle comprising a mop support and a cap which are separate and distinct elements, said mop support comprising a narrow elongated saddle portion having at each end of one surface thereof means defining a relatively projected, self stabilized support strap, said support straps having a limited degree of flexibility and being laterally aligned and normally conditioned to position in a relatively outwardly biased divergent relation, said saddle portion of said mop support being adapted to mount a mop over, in draped relation thereto, and intermediate the limits thereof defined by said support straps, said support straps each having coupling means in connection therewith, said cap being an integral shell-like structure having a top and a peripherally dependent wall structure the dependent limit of which bounds an opening at its bottom and includes means for the interconnection thereto of a mop handle, said peripherally dependent wall structure being rectangular and oblong in horizontal section, the opposite most remote inner side wall surfaces of said dependent wall structure defining the limits of the length thereof, each of said opposite most remote portions of the inner surface of said wall structure having strap retention means in connection therewith, said retention means being cup shaped at least in part, disposed within the interior of said cap and, in the assembled relation of said mop support and said cap, respectively nesting coupling means of one of said support straps, within the cup shaped part thereof in the interior of said cap, in a laterally contained biased relation thereto precluding inadvertent or accidental displacement of said mop support from said cap, said strap retention means each comprising two strap-like portions which are in a side by side spaced parallel relation, connected at one end to one of said remote opposite portions of said inner surface of said wall structure and projected therefrom in the direction of the other of said remote opposite surface portions of said inner surface of said wall structure and the strap-like portions of the retention means which project therefrom.

4,995,135

OSCILLATING WIPER DEVICE FOR MOTOR VEHICLE WINDSHIELDS

Gerd Kühbauch, Bühlertal, and Gotthilf Schaller, Leonberg, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

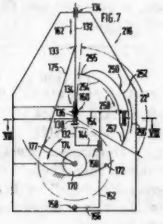
PCT No. PCT/DE87/00497, § 371 Date Apr. 4, 1989, § 102(e) Date Apr. 4, 1989, PCT Pub. No. WO88/03486, PCT Pub. Date May 19, 1988

PCT Filed Nov. 5, 1987, Ser. No. 347,771

Claims priority, application Fed. Rep. of Germany, Nov. 8, 1986, 3638159

Int. Cl.[5] B60S *1/44*

U.S. Cl. 15—250.21 12 Claims



1. An oscillating wiper device for windshields of motor vehicles, said oscillating wiper device comprisi..g an elongate wiper arm including an inner partial arm having oscillating support means and bush guide means, and a rod-like outer partial arm having a longitudinal axis and a control element; a wiper blade supported by said rod-like outer partial arm; means cooperating with said control element of said rod-like outer partial arm for enabling rotation of said rod-like outer partial arm about the longitudinal axis thereof upon oscillating movement of said wiper arm, said bush guide means of said inner partial arm supporting said rod-like outer partial arm for rotation about the longitudinal axis thereof and for relative longitudinal displacement thereof relative to said inner partial arm during operation of said oscillating wiper device; an elongate swivelling arm extending transverse to said inner partial arm and pivotably secured thereto, said means cooperating with said control element of said outer partial arm being arranged on said elongate swivelling arm and extending transverse thereto; a guide column extending parallel to the longitudinal axis of said rod-like outer partial arm and adjacent thereto, said elongate swivelling arm being connected to said guide column; and a guide bush connected with said rod-like outer arm and slidably and rotatably mounted on said guide column.

4,995,136

CONTROL SYSTEM FOR AUTOMATIC CAR WASH BLOWER

Charles R. Smith, Erial, N.J., assignor to Sherman Industries, Palmyra, N.J.

Continuation-in-part of Ser. No. 280,125, Dec. 5, 1988, Pat. No. 4,949,423. This application Jan. 12, 1990, Ser. No. 464,248

Int. Cl.[5] B60S *3/06*

U.S. Cl. 15—312.1 15 Claims

1. Automatic car wash equipment comprising:

(a) a forced-air dryer including a blower for producing high velocity air and a nozzle for directing said high velocity air toward vehicles being washed;

(b) support means for mounting said forced-air dryer above a path followed by said vehicles to direct said high velocity air from said nozzle to surfaces of said vehicles;

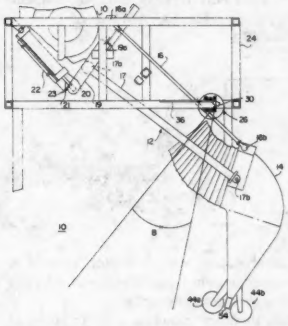
(c) drive means for moving said nozzle along a path toward and away from said vehicles;

(d) imaging means fixedly mounted to said support means

(1) for beaming a first signal toward the vehicle being dried, said vehicle producing a reflected second signal; and

(2) for receiving said reflected second signal;

(e) means for comparing said first signal to said second reflected signal and producing an output signal representative of the position of said vehicle;



(f) means for measuring the position of the blower nozzle relative to the vehicle and producing a position signal corresponding to the relative position of the blower nozzle; and

(g) means responsive to said output signal and said position signal for controlling said drive means to position said blower and blower nozzle in a predefined close proximity range of said vehicle.

4,995,137

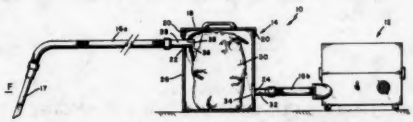
APPLIANCE FOR ASH REMOVAL

Per K. Reichborn, Greenwich, Conn., assignor to Goodway Tools Corporation, Stamford, Conn.

Filed Aug. 14, 1989, Ser. No. 393,593

Int. Cl.[5] A47L *5/36*

U.S. Cl. 15—327.1 1 Claim



1. An applicance for removing ash from a fireplace comprising a vacuum source, an intermediate container, and vacuum hoses attached to the intermediate container and defining a vacuum path from a fireplace through the intermediate container to the vacuum source, the intermediate container having a collector receptacle and a lid adapted for vacuum-tight attachment to the container, an inlet opening in the receptacle side wall to the interior of the receptacle, an inlet tube affixed to the side wall through the inlet opening having one portion thereof projecting into the interior of the receptacle defining a mounting for a vacuum bag and another portion thereof projecting outwardly from the side wall for receiving a vacuum hose defining a vacuum path to the fireplace, an outlet opening and an outlet tube affixed thereto for receiving a vacuum hose for defining the vacuum path to the source, the inlet and outlet tubes being located along a first container diameter on opposite sides of the container, a flame arrester covering the outlet opening, and a vacuum bag fitted to the inlet tube within the container and defining a closed portion of the vacuum path for receiving and containing soot and ash removed from the fireplace and cooperating with the flame arrester as first and

second barriers to hot coals passing out of the container into the vacuum source, and a bail affixed along the second diameter displaced approximately 45° from the first diameter.

4,995,138

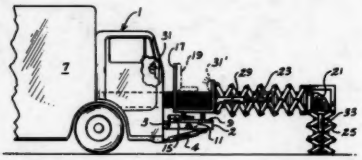
VACUUM APPARATUS FOR DEBRIS COLLECTION

Lawrence H. Pullen, 24301 Kakae Dr., Damascus, Md. 20872

Filed Nov. 6, 1989, Ser. No. 434,858

Int. Cl.[5] A47L *5/12*

U.S. Cl. 15—340.1 **3 Claims**



1. The combination with a motor vehicle for collecting debris having a vacuum tank collector and means for generating a vacuum therein comprising

a platform member mounted on the front of said motor vehicle for pivotal movement in a vertical plane,

first means for producing pivotal motion in said platform member,

a support base member mounted on said motor vehicle for pivotal movement in a horizontal plane,

second means for producing pivotal motion in said support base member,

an extendible tube having one end coupled to the vacuum tank collector and the other end adapted to be moved along the surface of the ground,

support linkage for supporting said tube along its length, one end of said support linkage being coupled to said support base member,

third means having one end coupled to said support base member and the other end coupled to said support linkage for extending and retracting said support linkage with respect to said support base member, thereby causing said tube to be extended or retracted,

whereby said tube is extendible and retractable along its longitudinal axis and pivotal in both horizontal and vertical planes.

4,995,139

TORQUE CONTROL SYSTEM FOR ENGINE PERFORMANCE TEST MACHINE FOR INTERNAL COMBUSTION ENGINES

Yorikatsu Suzuki, Kanagawa, Japan, assignor to Kabushiki Kaisha Meidensha, Tokyo, Japan

Filed Sep. 5, 1989, Ser. No. 402,790

Claims priority, application Japan, Sep. 5, 1988, 63-221582

Int. Cl.[5] G01L *5/13*

U.S. Cl. 73—116 **15 Claims**

15. A torque control system for an engine performance test machine for internal combustion engines comprising:

an oscillating type electric dynamometer including a rotor and an oscillating member being oscillatably supported around said rotor;

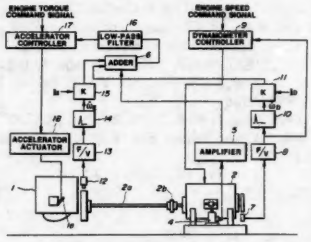
means for interconnecting the rotor shaft of said rotor and the rotating member of an internal combusion engine;

means for monitoring oscillating torque of said oscillating member to generate a signal representative of the oscillating torque;

means for generating a first torque signal representative of a first torque occurring at said rotor;

means for generating a second torque signal representative of a second torque occurring at said rotating member of said engine;

means for controlling the torque generated from said engine according to a control value derived on the basis of said



oscillating torque signal, and said first and second torque signals.

4,995,140

SLIVER CAN TRANSPORTING APPARATUS AND METHOD FOR A DRAW FRAME OF A TEXTILE MACHINE

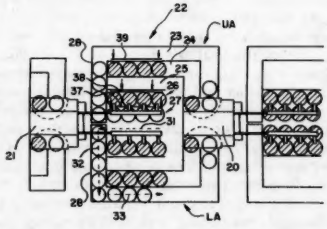
Siegfried Guenkinger, Heiningen; Markus Wurster, Owen/-Teck; Manfred Langen, Moenchengladbach, and Gregor Gebald, Korschenbroich-Pesch, all of Fed. Rep. of Germany, assignors to Zinser Textilmaschinen GmbH, Ebersbach/Fils, Fed. Rep. of Germany

Filed Feb. 2, 1990, Ser. No. 482,555

Claims priority, application Fed. Rep. of Germany, Feb. 21, 1989, 3905279

Int. Cl.[5] B65G *65/30*

U.S. Cl. 19—159 A **15 Claims**



1. A sliver can transporting apparatus for circulating sliver cans between a double row draw frame and a sliver supply station at which empty sliver cans are filled with sliver, comprising:

inner track means having a final can ready portion generally adjacent the double rows of the draw frame for supporting full sliver cans thereat in readiness for one-to-one replacement for empty sliver cans in the double rows of the draw frame, said inner track means extending from the sliver supply station and including means for transporting full sliver cans along said inner track means from the sliver supply station to said final can ready portion;

outer track means having a preliminary can ready portion generally adjacent said final can ready portion **11** of said inner track means for supporting a plurality of full sliver cans, said outer track means extending from the sliver supply station to the draw frame and including means for transporting empty sliver cans along said outer track means from the draw frame to the sliver supply station;

sliver can discharge means for discharging empty sliver cans from the draw frame to said outer track means;

final transfer means for transferring full sliver cans from said final can ready portion to the double rows of the draw frame; and

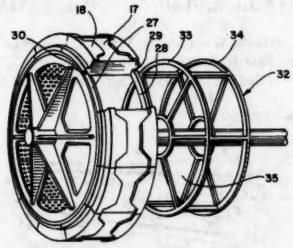
preparatory transfer means for transferring full sliver cans between said preliminary can ready portion and said final can ready portion.

4,995,141

METHOD AND APPARATUS FOR FACILITATING PRODUCT CHANGEOVER IN THE MANUFACTURE OF FLUFF PADS FOR DISPOSABLE DIAPERS

Steven G. Gould, Denmark, Wis., assignor to Paper Converting Machine Company, Green Bay, Wis.

Filed Jul. 16, 1990, Ser. No. 552,766
Int. Cl.[5] D01G *25/00*; D04H *5/05*
U.S. Cl. 19—148 8 Claims



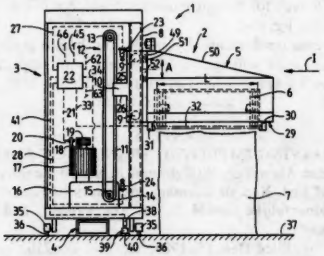
6. Apparatus for facilitating product changeover in the manufacture of fluff pads for disposable diapers comprising a frame having a spaced bearing and clamp means, a tube slidably mounted in said bearing and clamp means, a shaft rotatably mounted in said tube and having an end extending beyond said tube, a pad forming drum mounted on said shaft end, said tube being slidable in said bearing means upon release of said clamp means to move said drum from a first position to a second position, a fluff delivery hood on said frame aligned with said drum when the drum is in said first position, said drum in said second position being unaligned with said hood, said drum having a plurality of circumferentially extending screen forms releasably mounted thereon, said forms being releasable from said drum when said drum is in said second position.

4,995,142

APPARATUS FOR REMOVING FIBER FLOCKS FROM A LINE OF FIBER BALES

Rolf Binder, Schottikon, Fed. Rep. of Germany, and Daniel Hanselmann, Winterthur, Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Feb. 3, 1989, Ser. No. 306,402
Claims priority, application Switzerland, Feb. 4, 1988, 00399/88
Int. Cl.[5] D01G *7/00*
U.S. Cl. 19—80 R 9 Claims



1. An apparatus for removing fiber flocks from a line of fiber bales, said apparatus comprising:

at least one machine frame mounted for reciprocating along a path parallel to a line of bales;

at least one fiber removal means mounted in said machine frame for vertical up and down movement over a fiber bale, said means including at least one rotatable and drivable removal roll for removing fiber flock from a respective fiber bale;

means for pivoting said fiber removal means about a pivot axis within said machine frame; and

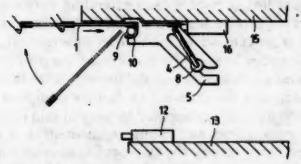
control means for pivoting said removal means in said machine frame into a predetermined inclined position while simultaneously and independently moving said removal means vertically during movement of said machine frame along said path.

4,995,143

DOOR OPERATING MECHANISM

Toshiaki Demura, and Ikuo Tonoki, both of Osaka, Japan, assignors to NEC Home Electronics Ltd., Osaka, Japan

Filed Feb. 8, 1989, Ser. No. 307,761
Claims priority, application Japan, Mar. 16, 1988, 63-34828; Jul. 30, 1988, 63-101925
Int. Cl.[5] E05D *11/06*
U.S. Cl. 16—357 10 Claims



1. A door operating mechanism for opening and closing a door with respect to a vertically-disposed opening of a case, said door adapted to move pivotally from a vertically closed position to a horizontally extended open position and horizontally from said horizontally extended open position to a horizontally retracted open position; said mechanism comprising:

hinge means for selectively connecting an upper end of the door to the case in a hinged manner so as to guide said pivotal movement of the door between a said vertical closed position and said horizontally extended open position wherein the door is extended outwardly from the case, said hinge means comprising a hook-shaped hinge member fixedly mounted on the upper end of said door; and a roller rotatably mounted on the case, said hinge member being selectively engaged with an outer periphery of said horizontally from said horizontally extended open position to a horizontally retracted open position; said mechanism comprising:

hinge means for selectively connecting an upper end of the door to the case in a hinged manner so as to guide said pivotal movement of the door between a said vertical closed position and said horizontally extended open position wherein the door is extended outwardly from the case;

means for guiding said horizontal movement of the door between said horizontal extended open position and said horizontal retracted open position where the door is received in the case;

a lateral movement preventing bar, said lateral movement preventing bar being defined by a main straight portion, a pair of opposed arm portions extending right-angularly respectively from opposite ends of said main straight portion, and a pair of end portions extending right-angularly respectively from one end of said opposed arm portions respectively remote from said main straight portion, said main straight portion being pivotally secured to the upper end of the door in such a manner that said lateral movement preventing bar is prevented from moving laterally of the door, said guiding means comprising a pair of opposed guide plates adapted to be fixedly mounted respectively on opposed said walls of the case and each having a slot, each of said end portions of said lateral movement preventing bar being engaged in a respective one of said slots so as to be moveable therea-

long in such a manner so that lateral displacement of said lateral movement preventing bar is prevented.

4,995,144

CONNECTOR

Martin F. Gateley, Kings Langley, England, assignor to Systemworks Limited, Hertfordshire, England

Filed Sep. 28, 1989, Ser. No. 414,028

Claims priority, application United Kingdom, Sep. 29, 1988, 8822880

Int. Cl.[5] E05D *7/00*

U.S. Cl. 16—261 **12 Claims**

9. An assembly comprising two elongate profile members connected together by two or more connectors for movement about a longitudinal hinge axis between a first, facing position in which a transverse axis of each said profile member extends in a common plane containing said hinge axis, and a second, side by side position, in which the transverse axes of the two profile members are substantially parallel and are on opposite sides of said hinge axis, wherein each said connector comprises two elongate link members each extending between and coupling the two profile members, said link members being arranged to cross relative to each other at a central portion of each link member in said first position of the profile members, and to extend substantially parallel to each other in said second position, wherein the connectors further comprise two connecting parts hingedly connected by way of said link members, each said connecting part being connected to a respective profile member whereby the two profile members are in their turn hingedly connected together, each said connecting part comprising a substantially U-shaped bracket fastened into a corresponding recess provided in the respective profile member, one end of each of the link members being received within, and pivotably fastened to, the U-shaped bracket, and wherein each said link member comprises an elongate web having a first face carrying two spaced, projecting pins and a substantially planar second face, the two link members being arranged with their second faces adjacent and with their pins projecting substantially longitudinally in opposite directions away from one another, the link members extending into the connecting parts with their pins being received in appropriate bores or recesses in the connecting parts.

4,995,145

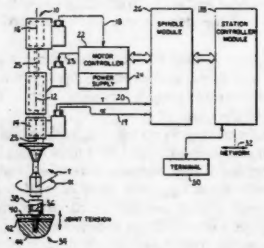
REDUCTION OF RELAXATION INDUCED TENSION SCATTER IN FASTENERS

Siavash Eshghy, Solon, Ohio, assignor to Allen-Bradley Company, Inc., Milwaukee, Wis.

Filed Jan. 8, 1990, Ser. No. 461,633

Int. Cl.[5] B23Q *17/00*

U.S. Cl. 29—407 **8 Claims**



1. A method of tightening a threaded fastener in a joint that may experience relaxation of tension with time to produce a desired tension related to a dynamic torque T_d, using a nutrunner including means for sensing the values of the torque applied to the threaded fastener and the angle of rotation of the threaded fastener comprising the steps of:

(a) applying torque to the fastener for advancing the fastener with respect to the joint;

(b) ceasing the application of torque to the fastener at the dynamic torque level T_d;

(c) waiting a relaxation time t_{rec} without the application of torque to the fastener; and

(d) reapplying torque to the fastener until the fastener first advances with respect to the joint after the reapplied torque.

4,995,146

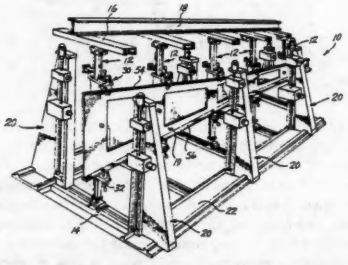
ASSEMBLY JIG AND METHOD FOR MAKING WING SPARS

Quentin T. Woods, Woodinville, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Oct. 26, 1988, Ser. No. 262,894

Int. Cl.[5] B23Q *3/02*

U.S. Cl. 29—281.3 **11 Claims**



1. A universal spar assembly jig characterized in that said jig is adaptable for use in producing wing spars having varies sizes, the size of any one wing spar being dictated by the particular wing design in which the wing spar is to be used, wherein each of said spars commonly include an elongated web, and upper and lower chord sections extending, respectively, along upper and lower longitudinal edges of said web, said spar assembly jig comprising:

a plurality of vertically upstanding spar-holding posts, each post including first clamp means, positioned adjacent said web's upper longitudinal edge, for both holding said web in a vertically upright position and for holding said upper chord section against said upper longitudinal edge, and second clamp means, positioned adjacent said web's lower longitudinal edge, for both holding said web vertically upright and holding said lower chord section against said lower longitudinal edge, wherein both said first and second clamp means are connected to said spar-holding post in a manner so that the vertical position of each clamp means is adjustable, to accommodate a variation in width of the web for the particular spar which is to be assembled on said jig; and

transverse track means for permitting lateral positional adjustment of said spar-holding posts with respect to each other along the length of said spar.

4,995,147

ROLL HAVING IMPROVED TRANSVERSE END SEALS

Karl-Heinz Ahrweiler, Willich, and Bernhard Funger, Krefeld, both of Fed. Rep. of Germany, assignors to Eduard Küsters Maschinenfabrik GmbH & Co. KG, Krefeld, Fed. Rep. of Germany

Filed Dec. 15, 1989, Ser. No. 451,210

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1988, 3843434

Int. Cl.[5] B21B *13/02*

U.S. Cl. 29—116.1 **19 Claims**

1. A roll comprising:

a rotatable hollow cylinder having an inner circumference and an outer working circumference;

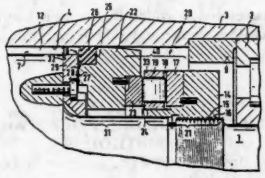
a stationary crosshead extending lengthwise through the

hollow cylinder to form a surrounding clearance space with the inner circumference of the hollow cylinder, said crosshead having ends protruding from the hollow cylinder upon which external forces for supporting the roll can be applied;

means provided in the clearance space for hydraulically supporting the hollow cylinder;

transverse end seals mounted near the ends of the crosshead extending between the crosshead and the inner circumference of the hollow cylinder to seal the clearance space, each transverse end seal including:

first and second radially extending, flat surfaces spaced from each other to define a clearance gap therebetween, said first and second surfaces being axially supported on the crosshead;



a first bearing ring mounted for rotation with the hollow cylinder and having ann outer portion, slightly displaceable relative to the remaining portion of the first bearing ring, sealing the clearance space at the inner circumference of the hollow roll, said first surface being formed on the first bearing ring;

a second bearing ring mounted on the crosshead; and

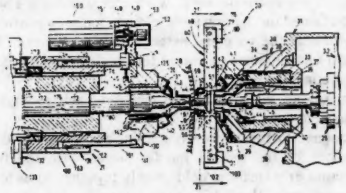
a roller bearing disposed between said first and second bearing rings maintaining, in conjunction with hydraulic fluid contained in the clearance space, the spacing between said first and second surfaces independent of relative displacement between the hollow cylinder and the crosshead.

4,995,148

ROBOTICALLY CONTROLLED MULTI-TASK END EFFECTOR

Giovanni B. Bonomi, and Battistino Oldani, both of Rockford, Ill., assignors to IMTA, Rockford, Ill.

Filed Mar. 30, 1990, Ser. No. 502,541
Int. Cl.[5] B23B *39/18*; B25J *11/00*
U.S. Cl. 29—26 A **14 Claims**



1. A multi-task end effector attachable to the articulatably moveable twist head of a computer controlled robot capable of imparting multiple linear and rotational axis movements to the end effector, comprising:

generally cylindrical interface means for detachably connecting the end effector coaxially over the outer end of the robot's twist head; said interface means also coupling power actuated means of the end effector to power supply systems of the robot;

a generally cylindrical tool head having an elongated hollow body connected coaxially to the outer end of said interface means,

a generally cylindrical nose piece mounted coaxially over the outer end of said body for limited pivotal movement relative thereto; and

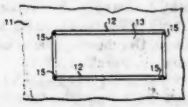
sensor means responsive to pivotal movements of said nose piece for indicating non-coaxial alignment of said nose piece and body.

4,995,149

METHOD FOR HERMETICALLY SEALING ELECTRONIC DEVICES

Ram J. Arvikar, N. Andover, Mass.; John W. Benko, Trenton, N.J.; Alexander Coucoulas, Basking Ridge, N.J., and Thaddeus Wojcik, Hopewell, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 26, 1990, Ser. No. 498,789
Int. Cl.[5] H01L *41/22*
U.S. Cl. 29—25.35 **16 Claims**



1. A method for making a hermetically sealed package for an electronic device comprising the steps of:

making in a stencil member an opening in the shape of a closed loop that surrounds an inner portion of the stencil member;

the closed loop opening being an opening that is continuous except for a plurality of web members each of which extends across the opening to secure the inner stencil portion to the remainder of the stencil member;

forcing a glass slurry through the opening onto a first substrate so as to form on the first substrate a substantially closed loop of glass slurry;

glazing the slurry to form a glass loop that is bonded to the first substrate;

placing the first substrate over a second substrate such that the glass loop surrounds an electronic device and contacts the second substrate along the entire length of the glass loop;

heating the glass loop sufficiently to soften it and to cause it to bond to the second substrate;

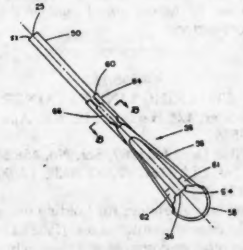
and cooling the glass loop so as to develop continuous hermetic seals to both the first and second substrates, thereby to isolate the electronic device from the external environment.

4,995,150

METHOD AND APPARATUS FOR MAKING FEMININE HYGIENIC INTERLABIA PADS

Roland W. Gerstenberger, Arden, and Philip E. Cantrell, Hendersonville, both of N.C., assignors to Xtramedics, Inc., Deerfield, Ill.

Filed Mar. 5, 1990, Ser. No. 488,989
Int. Cl.[5] D04H *1/22*; A61F *13/20*
U.S. Cl. 28—119 **14 Claims**



1. An apparatus for producing absorbent pads comprising:

a supply of absorbent material in elongated rope form;
a supply of outer cover material in elongated web form; said web of outer cover material having parallel elongated edges;
a die for joining said rope of absorbent material and said web of outer cover material; said die including a hollow tube; said tube having first and second open ends; said first open end receiving said rope of absorbent material and said web; means for sealing the elongated edges of said web of outer cover material; said open end of said tube expelling an elongated strand including said rope of absorbent material covered by said sealed web.

4,995,151

APPARATUS AND METHOD FOR HYDROPATTERNING FABRIC

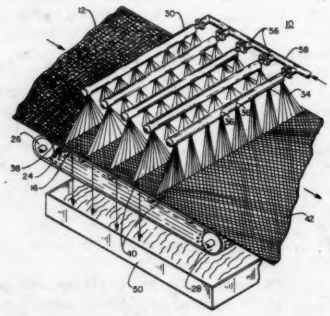
Jodie M. Siegel, Watertown, Mass.; Herschel Sternlieb, Brunswick, Me.; Timothy J. Connolly, Norwood; J. Michael Greenway, Westwood, both of Mass.; D. A. Parker, Somers, Conn., and Arlene T. Simon, Dorchester, Mass., assignors to International Paper Company, Purchase, N.Y.

PCT No. PCT/US89/01585, § 371 Date Jul. 17, 1989, § 102(e) Date Jul. 17, 1989, PCT Pub. No. WO89/09850, PCT Pub. Date Oct. 19, 1989

Continuation-in-part of Ser. No. 81,284, Apr. 14, 1988, Pat. No. 4,960,630. This PCT application Apr. 14, 1989, Ser. No. 411,491

Int. Cl.[5] D06B *5/08*; D06C *23/00*

U.S. Cl. 26—69 R **20 Claims**



11. A method for hydropatterning a visual pattern in a woven or bonded, nonwoven fabric, comprising the steps of:
conveying a sheet of the woven or bonded, nonwoven fabric along a machine direction supported on a support surface formed with a pattern of raised or solid areas and lowered or void areas interspersed therein;
directing a curtain of fluid downwardly to impact on the fabric as it is conveyed on the support surface, wherein said fluid curtain is substantially continuous across the fabric, such that a visual property of the fabric become altered in correspondence to the pattern of raised or solid areas and lowered or void areas of the support surface due to the impact of the curtain of fluid on the fabric against the support surface.

4,995,152

CHALKING LINE RETAINER

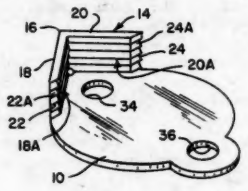
Edward T. Steckler, 124 Hershey Mill Rd., Apt. #A-1, Mountville, Pa. 17554

Filed Dec. 26, 1989, Ser. No. 456,535

Int. Cl.[5] F16G *11/00*; B43L *13/00*

U.S. Cl. 24—129 R **8 Claims**

1. A chalking string retainer for holding one end of a chalking string at the edge or corner of a surface to be marked with said string, said retainer comprising a plate, a bracket shaped in the form of a V depending from said plate, said V bracket having a pair of elongated legs forming an enclosed angle, said legs extending longitudinally adjacent a surface of said plate, a first hole on said retainer near the apex of the V through which



the string passes and at which the string is knotted and a second hole on said plate through which the string also passes for pulling.

4,995,153

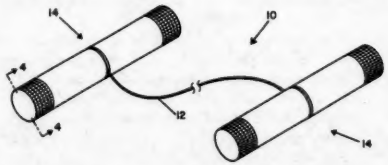
GLASS CUT-OUT WIRE GRIPPER APPARATUS AND METHOD

Ray Asbery, Round Rock, Tex., assignor to Equalizer Tools, Inc., Round Rock, Tex.

Filed Mar. 9, 1990, Ser. No. 491,342

Int. Cl.[5] A21C *5/00*

U.S. Cl. 30—116 **14 Claims**



1. A glass cut-out device comprising:
(a) a length of cutting wire;
(b) a first handle piece for each wire end;
(c) a second handle piece for each first handle piece;
(d) a first grip surface formed on each first handle piece;
(e) an elongated wire and container extending into each first handle piece, each wire end container having a wire receiving opening through which a wire end may be inserted and a closed end at the end opposite to the wire receiving opening, each wire end container also being positioned on the first handle piece so that a portion of the wire near the wire end extends over a portion of the first grip surface when an end of the cutting wire is received in the container;
(f) a second grip surface formed on each second handle piece; and
(g) connector means for connecting each first handle piece to one of the second handle pieces with the first and second grip surfaces held closely together so as to grip at least some of the cutting wire extending over the first grip surface.

4,995,154

NESTING FLATWARE SET

David J. Bamber, Wichita, Kans., assignor to Coleman Outdoor Products, Inc., Wichita, Kans.

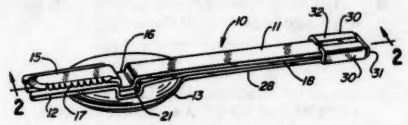
Filed Aug. 16, 1989, Ser. No. 394,487

Int. Cl.[5] A47J *43/28, 43/00*

U.S. Cl. 30—147 **11 Claims**

1. A nesting flatware set comprising a pair of eating utensils, each of the utensils having a pair of end portions and an intermediate locking portion, the intermediate locking portion of

one of the utensils having a dovetail slot and the intermediate locking portion of the other utensil having a dovetail projection sized to be frictionally retained within the dovetail slot whereby the utensils are releasably retained together.

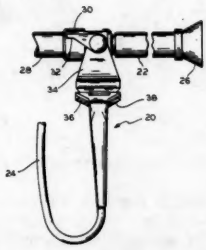


4,995,155

SHOWER SHAVER

Jefferson L. Gentry, Deerfield, Ill.; Alfons Rundzaitis, Beverly Shores, Ind., and Ronald O. Hilger, Elmhurst, Ill., assignors to Associated Mills, Inc.

Filed Mar. 29, 1990, Ser. No. 501,029
Int. Cl.[5] B26B *19/48, 19/38;* B25F *3/00*
U.S. Cl. 30—41 **8 Claims**



1. A shower shaver comprising a handle having an upper generally flat somewhat tray-like surface and further having a channel extending through said handle, said channel having two opposite ends one of which terminates at and communicates into said upper surface, a flexible tubing having a thin wall connected directly to said handle at an opposite end of said channel, said tubing having a length and wall thickness such that said shaver may be held in virtually any comfortable shaving position without requiring any special swivel fitting at any point between said tubing and said shaver, a generally flat cover part with an internal surface attached to and above the upper tray-like surface, said internal surface of said cover part and said upper surface of said handle part cooperating to form a generally flat somewhat fan shaped cavity, said shower shaver having an external surface with a forward edge having means thereon for attaching a razor blade thereto and at least one orifice in said cavity for emitting water directed toward said blade, said fan shaped cavity directing a sheet of water toward said orifice, thereby bathing said blade with a fast moving stream of water.

4,995,156

METHOD FOR ASSEMBLING COMPONENTS UPON PRINTED CIRCUIT BOARDS

Giuseppe R. Pinnavaia, Rieti, Italy, assignor to Texas Instruments Incorporated, Dallas, Tex.

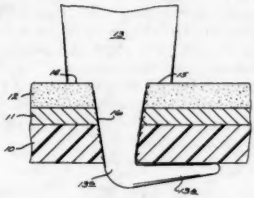
Filed Jun. 25, 1985, Ser. No. 748,390
Claims priority, application Italy, Oct. 4, 1984, 48499 A/84
Int. Cl.[5] H05K *3/32*
U.S. Cl. 29—838 **1 Claim**

1. A method for assembling electronic components upon printed circuit boards comprising the steps of:

providing a printed circuit board to have a selected thickness of conductive material on one side of the board embodied in circuit paths and portions of the circuit paths on which electronic components are to be mounted and to which the electronic components are to be electrically connected;

providing electronic components having lead pins which are tapered toward distal ends thereof and which have shoulders on the pins disposed to face said distal pin ends;

applying the distal ends of the tapered pins of the components upon the board in places on the conductive circuit path material on which and to which the electronic components are to be mounted and connected and pressing the components for forcing the pins to penetrate through the thickness of the board and conductive circuit path material to form respective tapered penetration hole portions in the board and entraining the conductive circuit path material into said tapered penetration hole portions thereby



electrically engaging the pins with the entrained conductive circuit path material within the tapered penetration hole portions, abutting said side-shoulders with the conductive circuit path material adjacent the tapered penetration hole portions, and protruding the distal ends of the pins from an opposite back side of the board, said pressing being carried out with sufficient slowness for thereby entraining the conductive circuit path material to creep into the tapered penetration hole portions without discontinuities; and

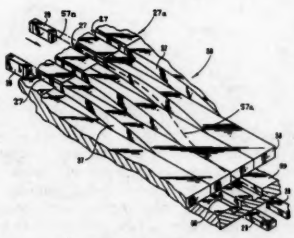
clinching the distal ends of the pins protruding from the back side of the board for retaining the pins and pin shoulders in electrical engagement with the conductive circuit path material.

4,995,157

COMPONENT FEEDER SYSTEM

Douglas R. Hall, Indianapolis, Ind., assignor to Reel-Tech Inc.

Filed May 16, 1989, Ser. No. 352,750
Int. Cl.[5] H05K *3/30*
U.S. Cl. 29—740 **20 Claims**



1. A chip component handling and loading system for orienting and transporting a plurality of generally rectangular solid chip components, said system comprising:

dispensing means for storing and delivering a plurality of randomly oriented chip components;

a plurality of substantially parallel component conveying tracks disposed in cooperating communication with said dispensing means;

a roll-over insert for changing the orientation of a plurality of generally rectangular solid chip components, each chip component having different length, width and thickness dimensions, said roll-over insert including (a) a plurality of entry ports arranged side by side and each being sized with a side-to-side width dimension corresponding to the thickness dimension of said chip components such that said entry port is only able to receive a corresponding chip component when it is oriented on its edge such that its side-to-side dimension is the thickness dimension and such that said entry port rejects any chip component which is oriented such that the side-to-side dimension of said chip component is either the length or width dimension of said chip component, (b) a plurality of exit ports arranged side by side and each being sized to a width dimension so as to receive the width dimension of the corresponding chip component and (c) a plurality of longitudinal channels, each having a longitudinal axis, connecting each entry port with its corresponding exit port, each channel configured with a helical twist about said longitudinal axis for turning the entering chip component approximately 90 degrees prior to leaving the exit port; and

pick and place means for concurrently transferring a plurality of chip components from said plurality of exit ports to a different location.

4,995,158

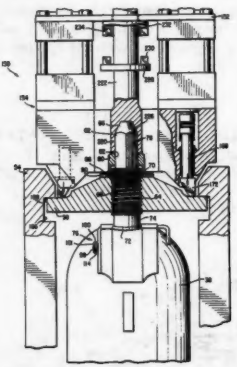
APPARATUS FOR SERVICING A JET PUMP HOLD DOWN BEAM IN A NUCLEAR REACTOR

David A. Howell, Plum Boro; Jeffrey E. Hydeman, Murrysville; Jeffrey L. Slater, Munhall; Richard J. Bodnar, Monroeville; Leonard R. Golick, Trafford; Robert S. Sekera, Monroeville, and Charles H. Roth, Jr., N. Huntingdon, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 8, 1989, Ser. No. 308,271

Int. Cl.[5] B23P *19/00*

U.S. Cl. 29—723 **39 Claims**



1. An apparatus for replacing the hold down beam of a fluid circulating jet pump mounted in a nuclear reactor, the hold down beam having a beam body, a pair of opposed beam tabs and a pair of opposed beam positioning trunnions extending outwardly from the beam body, the apparatus comprising:

a housing having a lower surface configured to be positionable over the body of the hold down beam;

means coupled to said housing for engaging the beam trunnions and securing the beam body against the lower surface of the housing;

means coupled to said housing for depressing the beam tabs while the beam body is secured against the lower surface of the housing;

means coupled to said trunnion engaging means and said beam tab depressing means for selectively actuating said trunnion engaging means and said beam tab depressing means from a position remote from the nuclear reactor; and

means connectable to said housing for selectively changing the directional orientation of the beam.

4,995,159

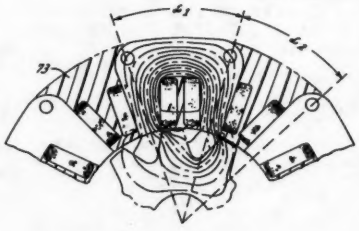
METHOD OF MAKING AN ELECTRONICALLY COMMUTATED RELUCTANCE MOTOR

Clyde J. Hancock, Loves Park, and James R. Hendershot, Rockford, both of Ill., assignors to Pacific Scientific Company, Newport Beach, Calif.

Division of Ser. No. 329,777, Mar. 28, 1989, which is a continuation-in-part of Ser. No. 232,436, Aug. 15, 1988, Pat. No. 4,883,999. This application Dec. 19, 1989, Ser. No. 452,513

Int. Cl.[5] H02K *15/02*

U.S. Cl. 29—596 **4 Claims**



1. A method of constructing a stator for a motor comprising the steps of:

cutting a plurality of U-shaped laminations from sheets of material characterized by high magnetic permeability;

stacking said plurality of U-shaped laminations to form a pair of poles;

winding insulated wire of a single phase about said pair of poles of said stacked U-shaped laminations such that energization of said windings forms magnetic poles of opposing polarity; and

repeating the foregoing steps for each phase of said motor and assembling the stacks of U-shaped laminations into an annular configuration that defines an annular spacing α_2 between adjacent poles of different pairs and an angular spacing α_1 between poles of the same pair, where the value of α_1 does not equal the value of α_2.

4,995,160

APPARATUS FOR MACHINING AXIALLY SYMMETRICAL WORKPIECE SURFACES

Karlheinz Schmid, Nürtingen, Fed. Rep. of Germany, assignor to Gebr. Heller Maschinenfabrik GmbH, Nürtingen, Fed. Rep. of Germany

Filed Feb. 9, 1989, Ser. No. 308,827

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1988, 3804502

Int. Cl.[5] B23C *3/06*; B23Q *3/157*

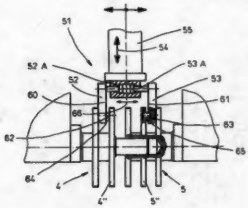
U.S. Cl. 29—568 **28 Claims**

1. In an apparatus for machining axially symmetrical workpiece surfaces, including two vises on the same axis and receiving a workpiece between them for the workpiece that is to be machined, and two headstocks, each of which has an arbor for a respective tool, the two headstock arbors being on a common axis and each therewith holds an end portion of a respective tool therebetween, with said two tools being aligned with one another, said vise axis being parallel to said headstock axis, comprising the improvement therewith wherein:

each of said tools has two ends, with one end of one of said tools facing one end of the other of said tools, and

means for installation of said facing tool ends thus being

supported against one another and including cooperating facing means on the tools so that said tools can be rotated independently and shifted axially relative to one another and so that for removal said tools are pushed together to such an extent that said tools are released from the arbors and can be automatically removed from the apparatus to minimize downtimes during removal and replacement of the tools.



2. An apparatus according to claim 1, in which said cooperating facing means comprise an axially extending projection at one end of the tool thereof, with the other of said tools being supported on said projection.

3. An apparatus according to claim 2, in which the other of said tools is provided with a recess for receiving said projection of said one tool.

15. An apparatus according to claim 3, which includes a loading mechanism for the installation and removal of said tools.

4,995,161

ELECTRICALLY CONTROLLED MACHINE TOOLS WITH TOOL CHANGING MEANS

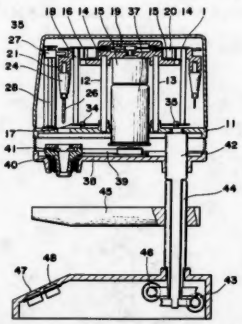
Yasushi Okamura, Yamaga; Toshiro Sosogi, Tamana, and Kosuke Takaki, Hotaku, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 3, 1989, Ser. No. 374,921

Claims priority, application Japan, Jul. 1, 1988, 63-165426; Jul. 1, 1988, 63-165428; Aug. 17, 1988, 63-204314

Int. Cl.[5] B23Q *3/157*

U.S. Cl. 29—568 **4 Claims**



1. A machine tool which comprises a chassis, a magnetic chuck support rotatably mounted on the chassis and magnetically removably carrying a plurality of chucks in a circular row, each of said chucks holding an associated rotatable processing tool, a chuck carrier operable to remove one of the chucks, carried by the chuck support and brought to a predetermined position relative to the chassis, from the chuck support, and a chuck drive unit for driving the chuck, removed from the chuck carrier, to bring the processing tool into a condition ready to process a workpiece.

4,995,162

MATTRESS ASSEMBLY INSTALLATION USING POSITIONING ROBOT

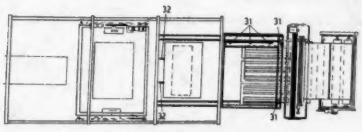
Antonio Beteré Cabeza, Madrid, Spain, assignor to Fabricas Lucia Antonio Betere, S.A. (Flabesa), Madrid, Spain

Filed Jul. 11, 1989, Ser. No. 378,292

Claims priority, application Spain, Jul. 12, 1988, 8802191; Apr. 6, 1989, 8901202

Int. Cl.[5] B23P *19/04*; B68G *7/00*

U.S. Cl. 29—564.2 **14 Claims**



1. A mattress assembly installation, comprising:

a plurality of mattress padding material spools for supplying separate matress padding materials in a material supply direction;

a receiving stage positioned downstream of said spools for receiving the mattress padding materials from said plurality of spools such that the mattress padding materials are superposed;

cutting means for cutting superposed mattress padding material portions from the supply of the mattress padding materials from said spools, said cutting means moving transverse to said material supply direction;

a first gluing means for deposition regulable strips of adhesive on the superposed mattress padding materials in a longitudinal direction parallel to said material supply direction;

a second gluing means for depositing regulable strips of adhesive on the superposed mattress padding materials in a lateral direction perpendicular to said material supply direction, wherein said first and second gluing means together provide strips of adhesive at four sides of the superposed mattress padding materials portions;

a conveyor means for conveying said superposed mattress padding material portions; and

a folding means for receiving an inverted mattress covering thereon, receiving said superposed mattress padding material portions from said conveyor means on said inverted mattress covering, and folding said superposed mattress padding material portions together with said inverted mattress covering onto a spring frame of a spring casing.

4,995,163

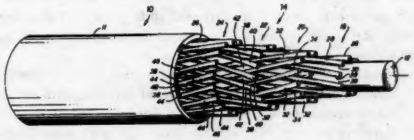
METHOD OF ASSEMBLING A CHROMATOGRAPHY COLUMN

Marcel Golay, La Conversion, Switzerland, assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Division of Ser. No. 41,554, Apr. 22, 1987, Pat. No. 4,872,979. This application Aug. 25, 1989, Ser. No. 398,676

Int. Cl.[5] B23P *19/04, 25/00*

U.S. Cl. 29—527.1 **10 Claims**



1. A method of assembling a chromatography column com-

prising the steps of; providing a cylindrical core element, forming plural layers of fibers onto said core element, each of said layers having plural fluid passageways, each of said passageways is defined by a space existing between every two adjacent fibers, wherein the step of forming the layers comprises,

winding an innermost layer of uniformly spaced fibers helically about the core element,

winding a plurality of concentric annular layers of uniformly spaced fibers about the innermost layer so that the fibers of each layer are helically wound about the next inwardly adjacent layer in reverse hand orientation relative to the next inwardly adjacent layer,

enveloping the outermost layer of fibers in a column housing, and

coating the fibers with stationary phase material.

4,995,164

MOTOR-DRIVEN CAN OPENER

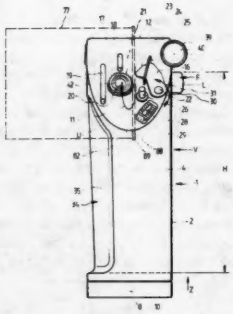
Georg Borger, Steinbach; Hartwig Kahlcke, Kronberg, and Ludwig Littmann, Königstein, all of Fed. Rep. of Germany, assignors to Braun Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Oct. 26, 1989, Ser. No. 428,058

Claims priority, application Fed. Rep. of Germany, Oct. 29, 1988, 3836925

Int. Cl.[5] B67B *7/46*

U.S. Cl. 30—423 **12 Claims**



1. A hand-held can opener for severing a lid from a can, comprising an elongated casing that defines a longitudinal axis, a drive wheel mounted on a shaft for rotation about a drive wheel axis, a cutter blade which is adapted to pivot about a cutter blade axis parallel to said drive wheel axis for operative association with said drive wheel, said casing having a working surface from which both said cutter blade and said drive wheel project, an electric motor arranged in the interior of said casing and having an output shaft that drives said shaft of said drive wheel through a gear train, said gear train including a series of spur gears, said electric motor, said spur gears and said drive wheel shaft being arranged along said longitudinal axis of said casing,

said output shaft of said electric motor, the shafts of said spur gears and said shaft of said drive wheel extending parallel to each other, and said longitudinal axis of said casing forming an angle (a) smaller than 90° with said shaft of said drive wheel.

4,995,165

ROLL-INDEPENDENT MAGNETO METER SYSTEM

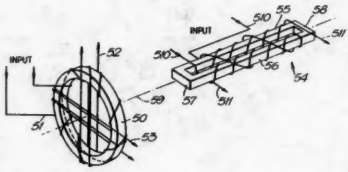
Brian W. Daniels, Weymouth, England, assignor to The Secretary of State for Defence in her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Sep. 29, 1989, Ser. No. 416,238

Claims priority, application United Kingdom, Apr. 14, 1987, 8708953; Nov. 3, 1987, 8725715

Int. Cl.[5] G01R *33/04*

U.S. Cl. 33—361 **13 Claims**



1. A roll-independent magnetometer system comprising two magnetic field sensors, said system comprising:

a first magnetic field sensor mountable on a moveable object and arranged to have iso-angular flux sensitivity about a roll axis; and

a second magnetic field sensor mountable on the object and arranged to have sensitivity along the roll axis wherein said second sensor is an elongate toroidal magnetic body having a large length to width ration, arrangeable lengthwise of the roll axis of the object and dimensioned to permit accurate spatial colocation with the first sensor, said second sensor is provided with a primary coil for connection to a source of an energizing alternating signal and a secondary pick-off coil encircling the magnetic body and having an axis parallel to the roll axis;

the arrangement being such that a component of a magnetic field along the roll axis is measured by the second unidirectional sensor and the component of the magnetic field lateral to the roll axis is measured by the first sensor.

4,995,166

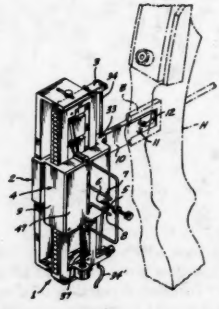
ARCHERY BOW RANGE FINDER AND SIGHT

Loren A. Knemeyer, 200 Rimrock Way Southeast, East Wenatchee, Wash. 98802

Filed May 18, 1990, Ser. No. 526,072

Int. Cl.[5] F41G *1/46*

U.S. Cl. 33—265 **13 Claims**



1. A range finder for an archery bow comprising an elongated frame having a cam member extending generally lengthwise thereof, means for mounting said frame on the bow in upright position extending generally lengthwise of the bow, a

slide member movable lengthwise along said frame, a pair of spaced range finder pins, a cam follower member carried by said slide member and including a portion engageable by said cam member of said frame for adjusting the position of said follower member in a direction transversely of said frame as said slide member is moved along said frame, and pin-mounting means carried by said slide member and carrying said range finder pins, said pin-mounting means being moved by said cam follower member so as to adjust the spacing between said pins based on the position of said cam member of said frame relative to said slide member.

4,995,167

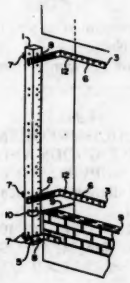
MASONRY GUIDE

William Sanchez, 303 Smith St., Clio, Mich. 48420

Filed Mar. 24, 1989, Ser. No. 328,403

Int. Cl.[5] G01C *15/10*

U.S. Cl. 33—404 **20 Claims**



1. A masonry guide for a building comprising:
(a) at least one vertical member having a first vertical face;
(b) at least two L shaped attachment brackets each having a first portion 90 degrees from a second portion thereof, the longitudinal axes of said portions being coplanar;
(c) means for connecting each first portion of each attachment bracket to the vertical member on the fast first vertical face thereof;
(d) means for attaching the second portion of each attachment bracket to a first surface of the building;
(e) an L shaped foot bracket having a first portion 90 degrees from a second portion thereof, the longitudinal axis of the portions being coplanar;
(f) means for attaching the L shaped foot bracket to the first vertical face of the vertical member.

4,995,168

TECHNIQUE FOR LOCATING SUBMERGED AND BURIED PIPELINES

James A. Shiner, 6926 Aswan, Corpus Christi, Tex. 78412

Filed Aug. 7, 1989, Ser. No. 390,385

Int. Cl.[5] G01B *5/20*

U.S. Cl. 33—529 **13 Claims**

1. A marine surveying device for locating pipelines buried under the floor of a body of water, comprising

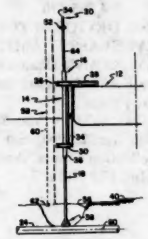
a barge having a template thereon including a multiplicity of vertical guides providing laterally spaced vertical axes extending into the water;

each of the vertical guides having a probe conduit constrained for vertical movement thereby and having

a foot on a lower end of each of the probe conduits of substantially larger cross-sectional size than the probe conduit and of substantially larger cross-sectional size than the guide;

means for delivering a pressurized fluid through each of the probe conduits for washing out the floor; and

means connected to the probe conduits for separately raising and lowering each of the probe conduits while delivering the pressurized fluid to penetrate the floor and locate the



buried pipeline by physical contact between the probe conduit and the buried pipeline

---

4,995,169

DEVICE FOR INDICATING ANGULAR POSITION

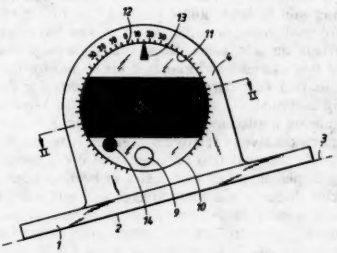
Göran Lundén, Falsterbo, Sweden, assignor to Moagon AG, Zurich, Switzerland

Continuation of Ser. No. 372,337, Jun. 19, 1989, abandoned. This application May 22, 1990, Ser. No. 527,651

Claims priority, application Sweden, Dec. 18, 1986, 8605437

Int. Cl.[5] G01B *3/56, 11/14*; G01C *9/12*

U.S. Cl. 33—534 **3 Claims**



1. A device for indicating angular position between a first part (5) and a part (6) which is rotatable relative to the first part, each of the parts exhibiting a grating (15, 16) consisting of a pattern which, for each grating, comprises opaque lines (17, 18), separated by interspaces (19, 20, 21, 22), the gratings together being arranged to provide an easily readable moreépattern which indicates whether the opaque lines in the one grating have a certain position relative to the opaque lines in the other grating, comprising:

the interspaces (19–22) of each grating (15, 16) exhibit mutually deviating width with a width increasing gradually over the height of the one grating (15) in a direction transverse to the longitudinal direction of the interspaces, and with a width gradually decreasing over the height of the second grating (16) transverse to the longitudinal direction of the interspaces in the same direction;

the opaque lines (17, 18) in each grating exhibit equal width and the opaque lines of the one grating (15) exhibit the same width as the opaque lines of the other grating; and

said two gratings (15, 16) being mutually identical but mirror-inverted so that the edge of the grating, at which the interspace having the least width is located, is located adjacent to the edge of the other grating (16), at which the interspace having the greatest width is located; and

said two gratings (15, 16) are so positioned in relation to one another that, at a central axis of symmetry (24), the one grating (15) exhibits a central opaque line (23) and the

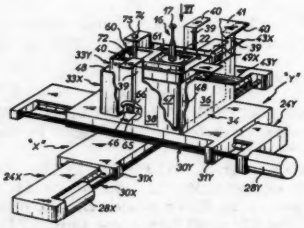
other grating (16) exhibits an interspace (25) directly in front of the central opaque line of the one grating.

4,995,170

CONTOUR READING DEVICE SUITABLE FOR USE ON EYEGLASS FRAMES

Francois Brulé, Sevran, and Alain Chansavoir, Luzancy, both of France, assignors to Essilor International Cie General d'Optique, Creteil Cedex, France

Continuation of Ser. No. 187,010, Apr. 27, 1988, abandoned. This application Apr. 2, 1990, Ser. No. 503,102
Claims priority, application France, Apr. 28, 1987, 87 06021
Int. Cl.[5] G01B 7/28
U.S. Cl. 33—551 20 Claims



1. Device for reading closed contours of articles, comprising a feeler adapted to continuously bear against and move with respect to an article to read its closed contour, a first carriage supporting said feeler, a guide guiding said first carriage for to-and-fro movement, a drive motor means for moving said first carriage on said guide, an auxiliary carriage associated with said first carriage and mounted for to-and-fro movement parallel to said first carriage, resilient means for floatingly mounting said auxiliary carriage relative to said first carriage and permitting limited movement in opposed directions, sensing means responsive to relative movement between said auxiliary carriage and said first carriage, said drive motor means effecting displacement of said feeler in bearing contact with the articles through said first carriage and said auxiliary carriage, said sensing means operably connected to said drive motor means for controlling the displacement of said feeler and for maintaining said feeler in bearing contact with an article in response to the relative movement between said auxiliary carriage and said first carriage.

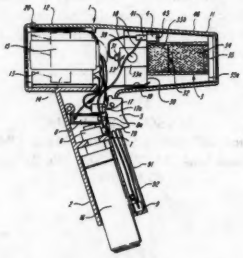
4,995,171

GAS COMBUSTION TYPE DRYER

Sadao Yoshinaga, Ichikawa, and Hiroyoshi Mashine, Souka, both of Japan, assignors to Prince Industrial Development Co., Ltd., Tokyo, Japan

PCT No. PCT/JP88/00015, § 371 Date May 13, 1988, § 102(e) Date May 13, 1988, PCT Pub. No. WO89/06095, PCT Pub. Date Jul. 13, 1989
PCT Filed Jan. 8, 1988, Ser. No. 214,736
Int. Cl.[5] A45D 2/00, 2/06
U.S. Cl. 34—97 4 Claims

1. A gas combustion type dryer comprising:
a dryer main body having a blowing barrel at the front thereof and a suction barrel at the back thereof, the former having a combustor therein and the latter having a fan, a fan motor and a battery therein;
a handle mounted below said dryer main body, said handle having therein a liquefied gas tank and a piezoelectric unit for electric discharge ignition and having an actuator mounted at the inner and upper wall of said handle;
a temperature controller mounted within said blowing barrel in cooperative association with said combustor; and
a pressure regulator mounted within said handle and coupled to said liquefied gas tank;
wherein said pressure regulator is coupled to said combustor via said temperature controller via a tube, and said combustor comprises:
a hollow tube main body having a jet nozzle at the back portion thereof and a combustion nozzle at the front portion thereof;



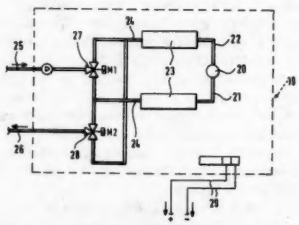
a tubular heater net mounted on said hollow tube main body at its front outer periphery; and
a block cover closing the front end of said heater net.

4,995,172

METHOD FOR HIGH-FREQUENCY DRYING OF COMBUSTIBLE GOODS AND, WITH FIRE SUPPRESSION

Kurt Friedrichs, Muckelhoven, Fed. Rep. of Germany, assignor to H. Krantz GmbH & Co., Fed. Rep. of Germany

Division of Ser. No. 323,805, Mar. 15, 1989, Pat. No. 4,896,433. This application Nov. 24, 1989, Ser. No. 504,412
Int. Cl.[5] F26B 3/34
U.S. Cl. 34—1 4 Claims



1. A method of drying combustible goods by a high-frequency electric field wherein said goods are continuously advanced through a drying tunnel wherein moisture is extracted and then carried off by an air stream traversing said tunnel, the improvement which comprises extracting an increment of said air stream, passing said extracted increment through filter means to remove impurities other than CO from said increment, subjecting said filtered increment to a sensor adapted to evaluate CO content of said filtered increment and activating a fire control system responsive to concentrations of CO sensed by said sensor in excess of a predetermined concentration.

4,995,173

HIGH TECH FOOTWEAR

I. Martin Spier, New York, N.Y., assignor to Leonard Cooper and Judith Cooper, both of Pelham Manor, N.Y., a part interest

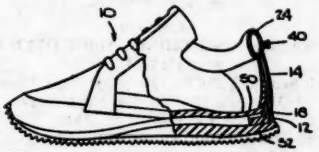
Filed Apr. 13, 1989, Ser. No. 337,265
Int. Cl.[5] A43B 13/20, 7/06
U.S. Cl. 36—29 10 Claims

1. In footwear having a toe end and a heel end and having an

outer sole extending from said toe end toward said heel end, said outer sole having an exterior surface for contact with the ground, and said footwear having an upper portion connected to said sole forming an enclosure for enclosing at least a part of the foot of a wearer between the outer sole and the upper portion, and within said enclosure an inner supporting surface for supporting the bottom of a foot, said inner supporting surface extending from the heel end toward said toe end, the improvement therein comprising:

bladder means for holding air, said bladder means being positioned at least partially within said enclosure;

pumping means including a compressible chamber for delivering outside ambient air to said bladder means by flexing said chamber, said pumping means being at least in part



located in a hollow space at said heel end, said hollow space being between said inner supporting surface and said exterior surface of said footwear, a flexible segment extending from a main portion of said sole and forming a surface of said hollow space and a portion of said exterior surface and having two ends, one said end being closer to said toe end of said footwear and connected to said main sole portion, said segment being subject to deflection by a force applied to said segment exterior surface, whereby said hollow space may be alternately reduced and returned to its unreduced size, in flexing in response to said force, the degree of flexure of said segment increasing as the distance from said main sole portion increases, said segment flexing said chamber to deliver said air.

4,995,174

SHOE WITH DETACHABLE TOE COVER

Ming-Che Hong, No. 5, Lane 76, Sec. 2, Shan Hsi Rd., Pei Chu, Taichung; Ching K. Wu, No. 1-4, Alley 174, Lane 77, Sec. 1, An Ho Rd., Tainan, and Martin Lee, Room 704, No. 592, Lin Sen N. Rd., Taipei, all of Taiwan

Filed Apr. 20, 1990, Ser. No. 512,740

Int. Cl.[5] A43C *13/14*

U.S. Cl. 36—72 R **3 Claims**

1. A shoe with a detachable toe cover including the combination of:

(a) a toe cover (**20**) comprising a sheath portion (**25**) at an upper end thereof and a rim portion (**21**) at a lower end thereof which are integral with each other with, said sheath portion (**25**) having a rounded front end (**24**) and an open rear end (**23**), said rim portion (**21**) having respective apertures (**22**) proximate to distal ends thereof; and

(b) a sole (**10**) with a placement track (**11**) at a front perimeter thereof for slidably receiving said rim portion (**21**), respective distal ends of said placement track (**11**) terminating in respective engagement cavities (**12**) which are substantially triangular in shape, said engagement cavities (**12**) having a securement wedge (**13**) which protrudes from a lower surface of said placement track (**11**) for engaging with said rim portion (**21**) at said aperture (**22**) thereof when said detachable toe cover (**20**) is slid to said distal ends of said placement track (**11**).

4,995,175

PNEUMATIC EXTRACTION HEAD

Johann Winter, Weikfeldstr. 9, 7085, Bopfingen-Aufhausen, Fed. Rep. of Germany

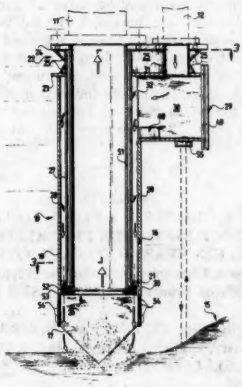
PCT No. PCT/EP88/00355, § 371 Date Oct. 20, 1989, § 102(e) Date Oct. 20, 1989, PCT Pub. No. WO88/08470, PCT Pub. Date Nov. 3, 1988

PCT Filed Apr. 27, 1988, Ser. No. 424,263

Claims priority, application Fed. Rep. of Germany, Apr. 28, 1987, 3714073

Int. Cl.[5] E02F *3/88*

U.S. Cl. 37—63 **11 Claims**



1. Pneumatic extraction head for underwater debris, for instance, sand and gravel, comprising a housing including a debris inlet opening in an open underside and a flange plate located at the top of the housing for connection with an extraction pipe and a compressed air duct, wherein a connecting pipe surrounding the debris inlet opening extends inside the housing between the debris inlet opening and the flange plate for forming a compressed air space between the inner wall of the housing and the outer wall of the connecting pipe and plural compressed air outlet openings are provided in the compressed air space, said extraction head further comprising, a base plate surrounding the debris inlet opening and arranged at the underside of the housing, said plural compressed air outlet openings being arranged at the base plate around the debris inlet opening in spaced relationship to one another; nonreturn valves for controlling the exit of compressed air and at said plural compressed air outlet openings; and control means arranged for controlling selectively at least one of the nonreturn valves to cause arbitrary opening and closing;

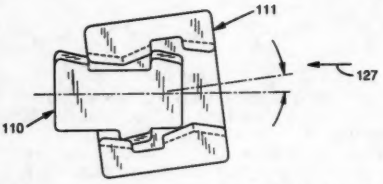
whereby air pressure exits from the compressed air outlet openings towards the debris, subsequent to which the air pressure, after being reversed, enters into the debris inlet opening together with the debris, and conveys the debris, together with the water, to the water surface.

4,995,176

REPLACEABLE WEAR ELEMENT, ASSEMBLY AND METHOD

Terry L. Briscoe, Portland, and Paul C. Sprunger, Dundee, both of Oreg., assignors to Esco Corporation, Portland, Oreg.

Filed May 24, 1990, Ser. No. 528,087
Int. Cl.[5] E02F *9/28*
U.S. Cl. 37—141 R **12 Claims**



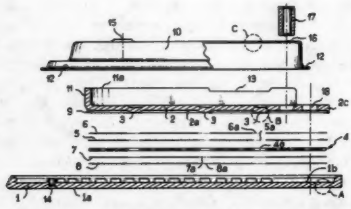
10. An assembly of wear elements for installation on the wearable part of a structure engageable with abrasive material comprising a relatively elongated base element adapted to be secured to said wearable part and a relatively elongated wear element releasably mounted on said base element along the longitudinal centerlines thereof said elements having confronting faces, each of said elements having opposed outstanding sidewalls equipped with mating dovetail surfaces within a plane containing the face thereof, a first sidewall of each element having a pair of longitudinally spaced apart dovetail surfaces both of which are inclined at the same angle to said centerline within said plane, the second of said opposing walls having a single dovetail surface inclined in said plane at the reverse angle to said centerline and positioned intermediate the adjacent ends of said first opposing wall pair of dovetail surfaces.

4,995,177

LAUNDRY-IRON SOLE-PLATE FORMED BY ASSEMBLING TOGETHER A PLURALITY OF METAL SHEETS BRAZED TO EACH OTHER

Bernard Louison, Chauanay, and Camille Burton, Villefranche s/Saone, both of France, assignors to SEB S.A., Selongey, France

Filed Dec. 29, 1989, Ser. No. 459,303
Claims priority, application France, Jan. 4, 1989, 89 00049
Int. Cl.[5] D06F *75/00, 75/14, 75/38, 75/18*
U.S. Cl. 38—88 **9 Claims**



1. A steam-iron sole-plate formed by assembling together a plurality of metal sheets brazed to each other and comprising a flat resistance heating element (**4**) between two of said sheets, wherein said sole-plate comprises :

a first plate (**1**) constituting, the sole-plate and having a face (**1***a*) adapted to come into contact with a textile article to be ironed, said first plate being formed by die-stamping a sheet of aluminum provided on the face (**1***b*) opposite to the face aforesaid with a roll-bonded layer of brazing alloy (**1***c*),

a second plate (**2**) constituting the bottom wall of a steam chamber and formed by die-stamping an aluminum sheet provided on the face (**2***a*) adjacent to the first plate (**1**) with a roll-bonded layer (**2***b*) of brazing alloy as well as with a series of bosses (**3**) in contact with said face (**1***b*) of the first plate (**1**) provided with a roll-bonded layer of brazing alloy,

said flat resistance heating element (**4**) being inserted between the two plates aforesaid (**1, 2**) and separated therefrom by electrically insulating layers (**5, 6, 7, 8**), the bosses (**3**) of the second plate (**2**) being engaged in gaps (**4***a*, **5***a*, **6***a*, **7***a*, **8***a*) formed in said heating element (**4**) and said insulating layers (**5, 6, 7, 8**),

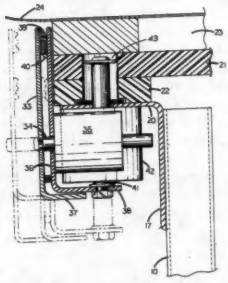
the two plates (**1, 2**) being assembled together by a peripheral fluid-tight brazed joint and a series of brazed joints formed at the level of the bosses (**3**).

4,995,178

MACHINE FOR STRETCHING FABRIC OVER A PANEL FRAME

Travis M. Randolph, 276 W. 13th St., Holland, Mich. 49423

Filed Sep. 19, 1989, Ser. No. 409,159
Int. Cl.[5] D06C *3/00, 3/08*
U.S. Cl. 38—102 **14 Claims**



1. A fabric-stretching machine having a frame and means on said frame providing a supporting surface, and also having opposed jaws disposed along at least a portion of the periphery of said supporting surface, said jaws being movably mounted with respect to said frame, wherein the improvement comprises:

means for establishing a direction of linear traversing movement of said jaws in a direction substantially perpendicular to said supporting surface from a position displaced from said supporting surface to and from a position to further displacement therefrom; and

means operable to open and close said jaws in a direction parallel to said supporting surface.

4,995,179

CARTRIDGE CLIP

Robert D. Switzer, 2200 N. Ft. Thomas Ave., Ft. Thomas, Ky. 41075

Filed Nov. 9, 1989, Ser. No. 413,279
Int. Cl.[5] F41A *9/25*
U.S. Cl. 42—50 **15 Claims**

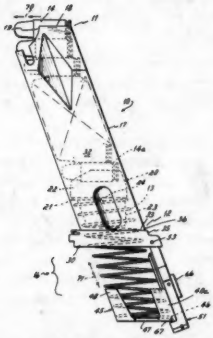
1. A spring release kit for a cartridge clip, said kit being initially detached from said clip, said clip having a magazine with an ejection end and a closed end, and a compression spring positioned within said magazine, cartridges that are loadable into said magazine being spring-loaded toward one end of said magazine for subsequent ejection therefrom, said kit comprising

a door frame initially detached from said magazine, said door frame being connectable to said magazine's closed end,

an access door mounted to said door frame, when said kit is

connected with said clip said access door being movable between a closed position where said magazine is operable to eject cartridges loaded in said clip and an open position where said compression spring length may be extended out of said magazine's closed end through said door frame to relieve temporarily the compression spring force within said magazine while loading additional cartridges into said clip through said magazine's ejection end,

a spring seat within which one end of said spring is receivable when said kit is connected with said clip, said spring seat thereafter being telescopable through said door frame



into said magazine when said access door is closed and telescopable through said door frame out of said magazine when said access door is open, and said one end of said compression spring thereafter being continuously seated in said spring seat whether said spring seat is telescoped inside or outside said magazine, and

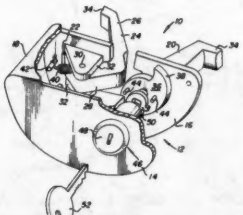
a drop out limit device partially carried by said magazine and partially carried by said spring seat, said drop out limit device functioning to limit the telescope out position of said spring seat when said access door is in said open position.

4,995,180

GUN LOCK

Leslie R. Tucker, New Metford Farm, East Bower, and Robin Tucker, Channel View, Over Stowey, both of Nr Bridgewater, Somerset, England

Filed May 14, 1990, Ser. No. 523,380
Int. Cl.[5] F41A *17/02*
U.S. Cl. 42—70.07 **5 Claims**



1. A lock for a gun comprising:

a body having a rear face;

first and second elongate jaw means mounted to said body and extending rearwardly of said rear face, said first and second jaw means having oppositely directed hook formations;

pivot means pivotally mounting said first jaw means to said body so that it is pivotable towards and away from said second jaw means;

cam means displaceably mounted to said body adjacent said first jaw means, said cam means having a cam surface and said first jaw means having follower means for cooperating with said cam surface, said cam surface being shaped so that displacement of the cam means in one sense urges said first jaw means to pivot away from said second jaw means; and

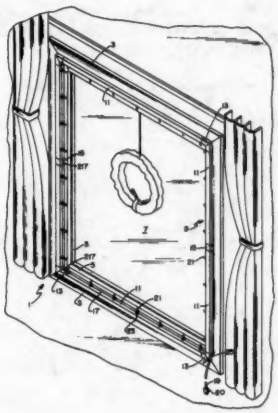
security actuator means for actuating displacement of said cam means.

4,995,181

LUMINOUS DISPLAY FRAME AND KIT

Hugh M. Wolf, 2343 S. Embers La., Arlington Heights, Ill. 60005

Continuation of Ser. No. 125,700, Nov. 27, 1987, abandoned.
This application Aug. 22, 1989, Ser. No. 398,290
Int. Cl.[5] A47G *1/06*; G09F *13/00*
U.S. Cl. 40—152.2 **21 Claims**



1. A frame for displaying a plurality of individual light bulbs which are connected by a common wire, comprising:

(a) a plurality of substantially tubular side frame members, each of which has at least five faces defining a hollow passage, wherein an adjacent pair of said faces have edges which are spaced apart so as to define a continuous longitudinal slot for receiving the common wire, the width of the slot being such that the spaced-apart edges serve as means for gripping and retaining the individual light bulbs at any point along the slot and substantially perpendicular to the slot; and

(b) a plurality of corner frame members, each corner frame members connecting the ends of two of said side frame members in a non-linear orientation;

at least one of said frame members having an exit passage through which the common wire extends.

4,995,182

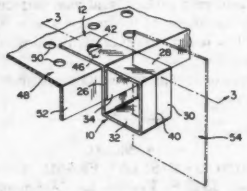
SIGN HOLDER WITH SHELF ATTACHMENT

Jacob Fast, 7561 NW. 9th Street, Plantation, Fla. 33317

Filed Jul. 27, 1988, Ser. No. 224,822
Int. Cl.[5] G09F *3/20*
U.S. Cl. 40—649 **7 Claims**

1. A sign holder for attachment to supermarket and like product-display shelving for mounting a label or like card in a prominent position projecting from a front edge of a shelf, the holder comprising an elongate member in the form of a strip of flexible sheet material having a mounting panel, an elongate

body portion extending from the mounting panel, securing means for securing a distal part of the body portion remote from the mounting panel to a proximal part of the body portion adjacent the mounting panel in a manner forming the body



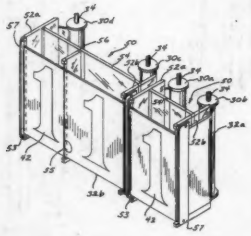
portion into a closed-loop formation, an elongate slit in the body portion between said parts for receiving the label or like card, and attachment means on the mounting panel for attaching the same to a shelf with the closed-loop formation projecting adjacent a front edge of the shelf.

4,995,183

SCROLLING SIGN WITH IMPROVED WEB GUIDE

Robert B. Aiken, Sr., 1970 Bobolink Avenue, Grafton, Wis. 53024

Filed Feb. 26, 1988, Ser. No. 160,791
Int. Cl.[5] G09F *11/18*
U.S. Cl. 40—518 **18 Claims**



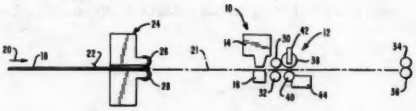
12. In combination, a scrolling sign having a framework and a sign face with a window in which indicia may appear, a pair of rotatable web rolls with a web containing serially arranged indicia wound thereon, said web extending along a path between the web rolls and across the window for selectively displaying indicia in the window, and a guide means for said web, said guide means comprising: a pair of plate-like members, said members lying along the path of the web and spaced from each other along the path, said members receiving the web, at least along an edge of each of said members, said web extending between said members from one member of said pair to the other member of said pair, said members lying parallel to each other and generally normal to the portion of the web extending between said members; brace means mounted to and extending between said plate-like members for joining said members into a unitary structure, said brace means extending between said plate-like members at a location removed from said edges of said plate-like members receiving the web so that the portions of said members containing said edges receiving said web are cantilevered beyond said brace means, adjustable length means extending between said cantilevered portions of said plate-like members, said adjustable length means establishing the distance between said plate-like members in a direction parallel to the path of the web; and means suitable for mounting said unitary structure containing said plate-like members on said framework so that said guide means positions the portion of the web extending between said members across the window.

4,995,184

PASSBOOK PAGE TURNING MECHANISM

Ken Ebato, Yokohama, and Susumu Sato, Ninomiya, both of Japan, assignors to NCR Corporation, Dayton, Ohio

Filed Nov. 6, 1989, Ser. No. 432,254
Claims priority, application Japan, Apr. 28, 1989, 1-107927
Int. Cl.[5] G09F *19/00*; B41F *19/00*; B41J *13/00*
U.S. Cl. 40—531 **8 Claims**



1. A page turning mechanism for a multiple-page record medium in a printer having means for feeding said multiple-page record medium along a feed path to a page turning station,

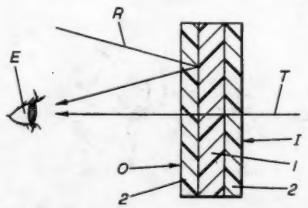
said page turning mechanism comprising a first movable roller and a second movable roller positioned at said page turning station, said first and second rollers being movable in a first direction parallel to said feed path to predetermined positions, means to rotate said first roller to turn up a page of said record medium, means for mounting said second roller for displacement from said first roller in said first direction parallel to said feed path and then for movement in a second direction perpendicular to said feed path toward said record medium so as to effect a bowed condition thereof, said first roller being movable from said predetermined position in a direction opposite said first direction parallel to said feed path for completing the turning of one page of said record medium.

4,995,185

PICTURE PLATE USING BOTH TRANSPIERCING LIGHT AND REFLECTION LIGHT

Chiang-Ming Cheng, 630-1, Diouke, Oaza-okubo, Urawa-shi, Saitama, 338, Japan

Filed Mar. 2, 1989, Ser. No. 317,991
Int. Cl.[5] G09F *13/16*
U.S. Cl. 40—582 **12 Claims**



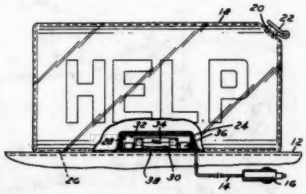
1. A device that uses either transpiercing light or reflection light to exhibit a visibly clear picture for both indoor and outdoor advertisement, display, or decoration purposes, said device comprising a semitransparent white plate fitted in between two transparent picture units each of the transparent picture units including one picture, the pictures being identical and in alignment with each other, and means for attaching each of the transparent picture units to the semitransparent white plate.

4,995,186

INFLATABLE WARNING SIGN

Russell Collie, Lake Worth, Fla., assignor to Boudreau and Collie, Lake Worth, Fla.

Filed Apr. 20, 1990, Ser. No. 511,744
Int. Cl.[5] G09F *21/04*
U.S. Cl. 40—591 9 Claims



1. An illuminated sign comprising a substantially airtight translucent bag, inflation means on the bag, said bag inflatable to a generally triangular prismatic shape with one of the rectangular sides thereof being the base of the bag,

illumination means for said sign comprising a box, lighting means in the box and a translucent cover forming a part of the box,

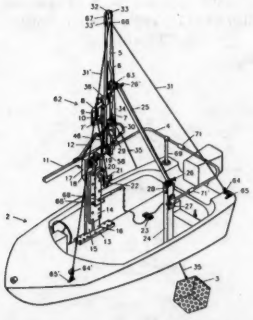
a pocket molded into the base of the bag and sized to accept the box, said pocket being separate from the box, means externally attaching the box in the pocket of the bag with the translucent cover facing the inside of the bag, the bottom of the box being substantially flush with the base of said bag as inflated, and means on the bottom of the sign for attachment to a vehicle.

4,995,187

CRAB POT MANAGING DEVICE

George M. Smyly, Sr., 1903-B, Carlton St., North Charleston, S.C. 29405

Continuation of Ser. No. 313,071, Feb. 21, 1989, abandoned.
This application Dec. 15, 1989, Ser. No. 440,671
Int. Cl.[5] A01K *73/00*
U.S. Cl. 43—8 4 Claims



1. A crab pot and the like managing device for a fishing vessel comprising:

(a) a first stanchion fixedly attached to the vessel deck and adjacent to the vessel gunnel such that said stanchion extends above said gunnel;

(b) a pivotable cross tee member secured at the upper outboard surface of said first stanchion, the combination of said cross tee member with said first stanchion forming a "T", said cross tee member having a fore, vessel bow directed lever arm and an aft, vessel stern directed support arm, and means for having a removably attached fastener adjacent to said cross tee member pivot point, said fastener providing means for locking and unlocking rotation means of said pivotable cross tee member;

(c) an elongated slide rail fixedly attached that the upper surface of said cross tee support arm such that said slide rail is perpendicular to said cross tee support arm, said slide rail being positioned near the aft end of said cross tee support arm and extending upward from said cross tee support arm when said pivotable cross tee member is locked, via means of said removably attached fastener, upon said first stanchion;

(d) a traveling open faced pulley assembly captured upon said slide rail such that cabling and winching means can move said open faced pulley assembly upwardly along said slide rail, the force of gravity providing means for downward movement of said traveling open faced pulley assembly along said slide rail;

(e) a pivotable plate, being a member of said traveling open faced pulley assembly, having two longitudinally spaced-apart, open faced pulleys fixedly attached thereto, and means for having interlocking pivotal levers for locking and unlocking the rotating of said pivotable plate;

(f) an open faced pulley fixedly attached to the outboard surface of said cross tee member support arm such that said pulley is in a coplanar relationship with said plate member pulleys when said pivotable plate member is locked via means of said interlocking levers;

(g) a spring loaded pull cord reel fixedly attached at a convenient location on said crab pot managing device such that a pull cord extends from said cord reel to the end of an unlocking lever arm member of said interlocking pivotal lever means;

(h) a fork shaped buoy retainer fixedly attached to said fishing vessel such that a buoy will be retained thereby when tension upon a hauling line extending from said buoy to a crab pot is trained about said coplanar pulleys;

(i) a second stanchion fixedly attached to said fishing vessel deck and adjacent to said vessel gunnel such that said second stanchion also extends above said gunnel, said second stanchion being laterally opposite said slide rail such that a detachably secured, diagonally positioned brace member extends downwardly from bracket attaching means on said slide rail to bracket attaching means at the top of said second stanchion;

(j) detachably secured guy lines extending from upper attaching means on said slide rail to fore and aft attaching means on said fishing vessel; and

(k) a protective tubular railing fixedly attached to said stanchions and said fishing vessel such that said railing surroundingly envelopes the work area of said fishing vessel.

4,995,188

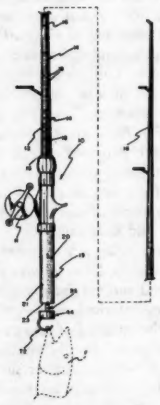
FISHING ROD AND METHOD FOR WEIGHING A FISH AND A SCALE FOR WEIGHING AN OBJECT

Brent L. Ewing, 1043 Coolidge, Wichita, Kans. 67203

Filed Sep. 8, 1989, Ser. No. 404,554
Int. Cl.[5] A01K *87/00*
U.S. Cl. 43—23 33 Claims

1. A fishing rod comprising a structurally tapering rod section having a structure defining a generally longitudinal bore; a rod with an external surface and slidably disposed in said generally longitudinal bore, said rod having weight calibrations spaced longitudinally along the external surface thereof; a calibrated spring helically surrounding the external surface of the rod within the generally longitudinal bore and biasingly urging continuously the rod within the generally longitudinal bore; a hook support member connected to an end of the rod; and a hook member pivotally connected to the hook support member; and said calibrated spring yieldably, biasingly maintains the hook support member in an abutting relationship

against said rod section when the rod is not being extended away from the rod section; and said hook support member has



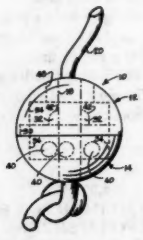
a structure defining an external wall, a top, and a hook recess formed along a portion of the external wall and the top.

4,995,189

RATTLING FISH LURE

Michael W. Crihfield, 14101 Michoud Blvd., Apt. 504, New Orleans, La. 70129

Filed Dec. 4, 1989, Ser. No. 445,003
Int. Cl.[5] A01K *85/00*
U.S. Cl. 43—42.31 **15 Claims**



1. A rattling fishing lure comprising:

a. a partially hollow cap member having a generally hemispherical exterior,

b. a plurality of metal spheres,

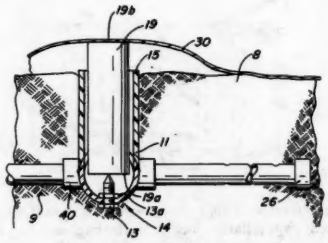
c. a partially hollow base member having a generally hemispherical exterior, said base member having chamber means therein for containing said metal spheres for making sound waves in water attractive to fish, said chamber means having wall means therein which divides said chamber means into two equal parts, said base member and said cap member being force fitted together to form a partially hollow sphere which contains said metal spheres therein for producing sound waves in water attractive to fish, said base member having sleeve means therein for receipt of a fishing line.

4,995,190

SOIL STERILIZATION APPARATUS

C. Richard Royer, Box 363, Spruce Hill Rd., Ottsville, Pa. 18942

Filed Oct. 27, 1988, Ser. No. 263,004
Int. Cl.[5] A01C *00/00*
U.S. Cl. 47—1.01 **17 Claims**



1. An apparatus for sterilizing unsterilized soil which comprises:

(a) a length of enclosed conduit means;

(b) a plurality of tubular means wherein each tube is closed at one end, and their respective second ends are coupled along the length of said conduit means, and wherein each of said tubular means includes a plurality of apertures along its length,

(c) said apertures being directed in an upward and downward direction;

(d) means further coupled to said conduit means for controllably releasing a pressurized and premeasured quantity of fumigant through said apertures for permeating said unsterilized soil to cause it to become sterilized; and

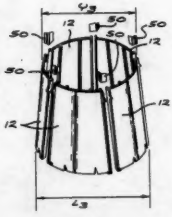
(e) said coupled means being partially located within said conduit means for facile distribution of said fumigant throughout said tubular means.

4,995,191

COMBINED ROOT BARRIER AND WATERING COLLAR ARRANGEMENT

James N. Davis, 3551 Scotland Dr. N., Highlands, Calif. 95660

Filed Oct. 11, 1988, Ser. No. 256,050
Int. Cl.[5] A01G *17/00*
U.S. Cl. 47—25 **22 Claims**



1. A panel for a multiple panel combined planter and watering collar, said panel comprising, in combination:

a thin, flexible body means having an upper arcuate edge, a lower arcuate edge spaced from said upper arcuate edge, a first lateral edge, a second lateral edge spaced from said first lateral edge, an inner surface and an outer surface;

interior rib means on said inner surface of said body means and projecting therefrom and said interior rib means intermediate said first lateral edge and said second lateral edge of said body means;

body means weakening means adjacent said interior rib

means at said lower arcuate edge for providing an initial location for tearing said body means for the condition of a root exerting body means tearing force at said body weakening means; and

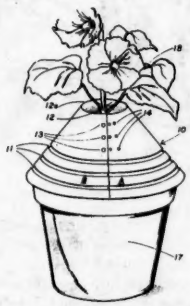
joining means on said first and said second lateral edges.

4,995,192

SOIL COVER FOR POTTED OR IN-GROUND PLANTS

Richard DeWid, Raleigh, N.C.

Filed Nov. 27, 1989, Ser. No. 441,549
Int. Cl.[5] A01G *13/00*
U.S. Cl. 47—30 13 Claims



1. A soil cover for protecting soil surrounding a plant that extends upwardly from the soil wherein the soil cover is transformable from a sheet-like configuration to a self-supporting conical soil protector that extends around the plant and over underlying soil extending around the plant, comprising:

(a) a flexible collar having a main body portion, inside and outside curved edges, and a pair of end portions;

(b) attachment means formed on the collar for attaching the respective end portions together;

(c) the flexible collar being adapted to assume a sheet-like configuration but which is transformable into a conically shaped soil protector that wraps around the plant and extends over the underlying soil;

(d) wherein in the transformed soil protector configuration the collar forms an upright conically shaped soil protector having a relatively small upper opening for the plant to extend therethrough and a relatively large lower base opening disposed below the upper opening, wherein when the opposite end portions of the collar are attached the cut out forms the relatively small upper opening within the conically shaped soil cover that enables a plant to project therethrough; and

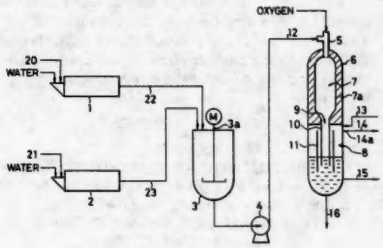
(e) wherein the transformed soil protector mode the collar forms a surrounding side wall structure that surrounds the plant and from the upper opening extends downwardly and outwardly from the plant such that water falling on the side wall structure of the soil protector tends to run downwardly and outwardly along the side wall structure such that the soil protector is effective to cover a portion of the soil surrounding the plant and thereby covers a portion of the underlying soil so as to effectively control the amount of water reaching the soil surrounding the plant.

4,995,193

METHOD OF PREVENTING ADHERENCE OF ASH TO GASIFIER WALL

Kunio Soga; Kazuo Okada; Noriaki Tanaka; Morio Sogame, and Toshio Tsujino, all of Yamaguchi, Japan, assignors to Ube Industries, Ltd., Ube, Japan

Filed Jul. 18, 1990, Ser. No. 553,632
Int. Cl.[5] C10J *3/46*
U.S. Cl. 48—197 R 4 Claims



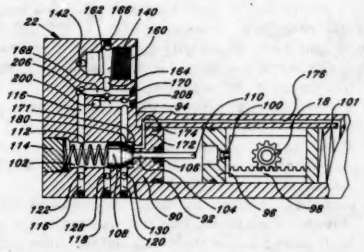
1. A method of partially oxidizing petroleum coke and coal while preventing the adherence of the ash to the wall of a gasifier, said method comprising the steps of: pulverizing said petroleum coke and coal; introducing the pulverized petroleum coke, 10 to 30 wt % of coal based on said petroleum coke and oxygen in a smaller amount than the amount necessary for burning said petroleum coke and coal so as to partially gasify said petroleum coke and coal at a temperature higher than the melting point of the ash of said coal; blowing the gas produced during said partially oxidizing step to the water in a quench chamber through a throat and a dip tube in said gasifier; and taking out said gas which has passed through said water of said gasifier.

4,995,194

POWER-ASSIST DOOR CLOSER

Eckart F. Schultze; Richard Easter, and Robert V. Funderburk, all of Charlotte, N.C., assignors to Yale Security Inc., Monroe, N.C.

Filed Mar. 27, 1990, Ser. No. 500,023
Int. Cl.[5] E05F *15/10*
U.S. Cl. 49—32 14 Claims



1. An hydraulic power-assist door closer comprising

(a) a cylinder having a pinion mounted therein with an external drive shaft operatively connected to the door,

(b) a piston operatively disposed in the cylinder and formed with a rack engaging the piston,

(c) a manifold block secured against the cylinder and having a boss sealingly disposed in an end of the cylinder,

(d) check valve means in the piston adapted to close as the piston moves toward the said end and open when the door is opened manually,

(e) spring means in the cylinder urging the piston in the direction of the block,

(f) a pump mounted against the opposite side of the block from the cylinder and having an inlet port and a pressure outlet port disposed flat against the manifold,

(g) means to drive the pump,

(h) door-opening pressure passage means in the manifold conducting oil from the pressure outlet port through the boss and into the said end of the cylinder,

(i) a plunger chamber in the manifold adjacent the boss,

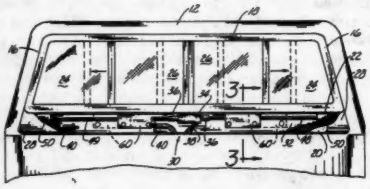
(j) door-opening return passage means in the cylinder and manifold conducting oil from the cylinder at a point on the opposite side of the piston from the boss, through the boss and into the plunger chamber adjacent the boss and out the chamber adjacent the boss and into the inlet port of the pump.

4,995,195

AUTOMATIC REAR WINDOW

Gordon D. Olberding, P.O. Box 95, and Mahlon W. Shearer, HC 71, Box 33, both of Stuart, Nebr. 68780

Filed Aug. 22, 1990, Ser. No. 570,769
Int. Cl.[5] E05F *17/00*
U.S. Cl. 49—118 **2 Claims**



1. An automatic rear window for a vehicle, comprising:

a frame including lateral sides, a top, and a bottom;

a track disposed between the top and the bottom of the frame and disposed to extend between the lateral sides of the frame;

a stationary side window pane disposed at least lateral side of the frame between the track and the top;

a pair of movable central window panes disposed in the frame between the track and the top adapted to simultaneously move on the track in opposite lateral directions between an open position wherein the central panes extend over the side panes, and a closed position wherein the central panes abut one another; and

drive means for simultaneously moving the central panes in opposite lateral directions, the drive means being disposed below the track and including:

a reversible electric motor operably connected to a power source in the vehicle, said motor being disposed in the frame below the track, said motor including rotating output shafts extending laterally from each side of the motor;

means for selectively activating the motor; a left-hand threaded shaft having one end attached to the output shaft on one side of the motor and the other end journalled in a first support bearing;

a right-hand threaded shaft having one end attached to the output shaft on the other side of the motor, and the other end journalled in a second support bearing;

a first bracket having a lower portion threadably attached to the left-hand threaded shaft and an upper portion attached to one of the central panes; and

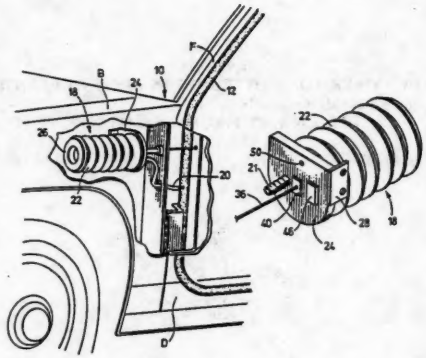
a second bracket having a lower portion threadably attached to the right hand threaded shaft and an upper portion attached to the other of the central panes.

4,995,196

PROGRAMMED AIR LEAK FOR DEFLATABLE WEATHERSTRIP SYSTEM

Jack E. Smith, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Jul. 17, 1989, Ser. No. 380,421
Int. Cl.[5] E06B *7/16*
U.S. Cl. 49—477 **3 Claims**



1. An apparatus for sealing between a closure and a body such as a door and door frame of a vehicle, comprising:

a deflatable sealing member for resilient interference engagement between said closure and said body;

vacuum source means in the form of a bellows actuatable by resilient memory to form a vacuum when connected to said deflatable sealing member; means for mounting said bellows at one end to one of said closure or said body and including an opposite, relatively displaceable end for actuating said bellows to condition said bellows for actuation by resilient memory;

means for connecting said relatively displaceable end of said bellows to the other of said closure or said body to contract said bellows for actuation by resilient memory only during opening of said closure, said bellows being expanded by resilient memory during closing of said closure; and

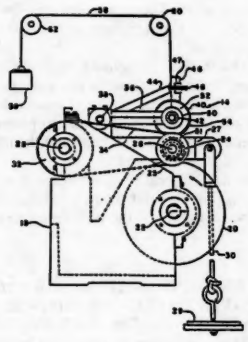
a flow control circuit connected to said bellows including first valve means operable to open said bellows to atmosphere during contraction of said bellows, second valve means operable to connect said sealing means to said bellows during actuation by resilient memory to deflate said sealing member to a reduced cross section only during closing of said closure so as to allow passage of air from inside the vehicle past said sealing member to substantially reduce closing effort and eliminate compression shock, and a bleed port continuously directly connecting said bellows with atmosphere, said bleed port having a predetermined size that assuredly allows said bellows to overcome air flowing from the atmosphere through said bleed port into said bellows during contracture so as to effect the deflation of said sealing member but also assuredly allows the internal pressure of said sealing member to return to atmospheric pressure and expand said sealing member by resilient memory to full cross section after closing of said closure so as to provide firm sealing engagement with the desired resilient interference between said closure and said body.

4,995,197

METHOD OF ABRADING

Chiung-Huei Shieh, 5 Philbrook Ter., Lexington, Mass. 02173; John M. Funt, 11 Bryon Dr., Nashua, N.H. 03062, and George B. Ouyang, 127 Follen Rd., Lexington, Mass. 02173

Filed Jan. 29, 1990, Ser. No. 471,552
Int. Cl.[5] B24B *1/00*
U.S. Cl. 51—281 R 26 Claims



1. A method of abrading a tire tread compound to determine the irregular wear characteristics of the compound, comprising the following steps:

weighing at least two sample wheels, wherein each sample wheel includes a tire tread compound;

abrading the tire tread compound of each sample wheel by rotating each sample wheel in engagement with a respective grindstone at a first slip value, the slip value being based on the difference between the velocities of the sample wheels and the grindstones;

weighing each sample wheel again to measure the abrasion resistance of the tire tread compound at the first slip value and generating a first index value indicative thereof, the index value being based on a comparison of the abrasion resistance of the tire tread compound to the abrasion resistance of a reference compound at the same slip value;

abrading the tire tread compound of each sample wheel by rotating each sample wheel in engagement with a respective grindstone at a second slip value, the second slip value causing a higher level of abrasion severity than the first slip value;

weighing each sample wheel again to measure the abrasion resistance of the tire tread compound at the second slip value and generating a second index value indicative thereof;

abrading the tire tread compound of each sample wheel by rotating each sample wheel in engagement with a respective grindstone at a third slip value, the third slip value causing a higher level of abrasion severity than the second slip value; and

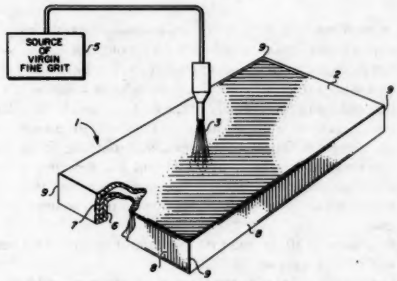
weighing each sample wheel again to measure the abrasion resistance of the tire tread compound at the third slip value and generating a third index value indicative thereof, and comparing the first, second and third index values to each other and/or to the corresponding index values of other tire tread components tested to determine the irregular wear characteristics of the tire tread compound.

4,995,198

METHOD FOR MAKING A REFLECTANCE CALIBRATION PLATE HAVING A NEAR-LAMBERTIAN SURFACE

Joseph E. Zupanick, Richardson, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Sep. 17, 1984, Ser. No. 651,023
Int. Cl.[5] B24C *1/00*
U.S. Cl. 51—319 9 Claims



1. A method for making a test plate having a reflective surface exhibiting a near-Lambertian characteristic comprising the steps of:

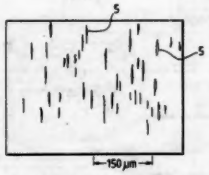
(A) bonding a ceramic coating to a surface of a rigid substrate, said ceramic coating being of sufficient thickness to prevent alteration of its surface spectral characteristics during the performance of step (B); and (B) sandblasting at least one surface of the ceramic coating employing a fine abrasive in such condition that angular, and not rounded, pits are obtained in the sandblasted ceramic surface.

4,995,199

MAGNETIC TAPE CASSETTE HAVING IMPROVED GUIDE POLE STRUCTURE

Takahito Miyoshi; Minoru Kanazawa; Tsutomu Sugisaki; Takuzi Yamada, and Yasutoshi Okuzawa, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Division of Ser. No. 205,759, Jun. 13, 1988, Pat. No. 4,930,032.
This application Dec. 19, 1989, Ser. No. 452,654
Claims priority, application Japan, Jun. 15, 1987, 62-90717[U]; Jun. 26, 1987, 62-97437[U]
The portion of the term of this patent subsequent to Feb. 19, 2008, has been disclaimed.
Int. Cl.[5] B24B *1/00*
U.S. Cl. 51—326 5 Claims

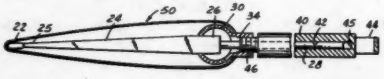


1. A method for manufacturing a guide pole for a cassette tape, comprising the steps of: providing a cylindrical stainless steel base member; subjecting said base member to centerless grinding to roughen a surface of said base member; and subjecting said base member to barrel finishing using as an abrasive inorganic particles having a Moh's hardness of more than 9 to secure some of said particles to said finished surface.

4,995,200
SANDING TOOL

Edward Eberhart, 116 S. Rogers, Northville, Mich. 48167

Filed Feb. 27, 1990, Ser. No. 485,971
Int. Cl.[5] B24D *15/00, 17/00*
U.S. Cl. 51—358 **3 Claims**



1. A sanding tool which utilizes a closed flexible loop of material with an abrasive surface which comprises:

(a) an elongate body support member having a generally first axis with a relatively thin loop, transverse reaction bar at one end lying transversely of the first axis and to lie within and to support a distal end of a closed abrasive loop, and an elongate, flat tongue member extending from said reaction bar to a proximal head end and tapering in two dimensions from a narrow dimension smaller than the reaction bar to a wider dimension at the proximal head end,

(b) a control shaft on said first axis extending from said head end of said tongue,

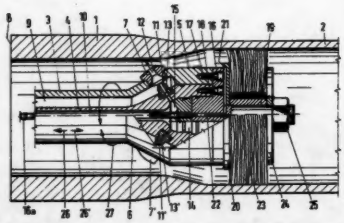
(c) a retainer and tensioning element at said head end having a recess on said axis to receive an acircular portion of said head end of said tongue member in a sliding relationship and having a proximal surface to support a proximal end of an abrasive loop, said retainer having a threaded boss extending away from said proximal surface, and

(d) a hollow handle on said first axis having an axial bore and having a threaded portion to cooperated with said boss, and means at the proximal end of said bore to contact the end of said control shaft to move said shaft and tongue and transverse reaction bar toward the distal end of an abrasive loop to tension the loop between said reaction bar and said retainer element as said threaded portion on said handle is moved relative to the threaded boss.

4,995,201
DEVICE FOR THE SURFACE CLEANING OF A HOT DEFORMED PIPE END

Wulff-Eckard von Borcke, Haan, and Wilfried Meyerling, Krefeld, both of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

Filed Feb. 27, 1990, Ser. No. 485,303
Claims priority, application Fed. Rep. of Germany, Mar. 1, 1989, 3906937
Int. Cl.[5] B24C *3/16, 3/32;* **B08B** *3/00*
U.S. Cl. 51—411 **5 Claims**



1. In a device for surface cleaning of the inner surface of a hot deformed pipe end, having an axially moveable blast lance carrying a blast nozzle head having a closed end, with at least one blast nozzle on the blast nozzle head, and a supply line for a gaseous medium and an abrasive which are mixed together in the blast head and discharged through the blast nozzle, the blast nozzle for being adjusted at an angle relative to the inner surface of the pipe, the improvement wherein:

the blast lance has inner and outer coaxially aligned rotatable hollow tubes communicating with the blast nozzle head, each tube having an enlarged outer end;

the inner tube has at least one injector for directing gaseous medium to said at least on blast nozzle, which is located on the outer tube, for discharge therethrough,

the outer tube for transporting the abrasive to mix it with the gaseous medium and to discharge the mixture through said at least one blast nozzle;

an axial pipe is disposed coaxially within the inner hollow tube, forming an axial bore between the pipe and the inner hollow tube, and extends through the closed end of the blast nozzle head:

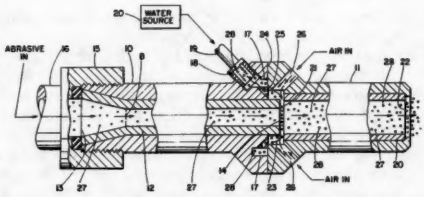
a deflector attached to the closed end of the blast nozzle head having radially extending passageways which communicate with said axial pipe and penetrate through the periphery of said blast nozzle head to provide a gas curtain between the blast nozzle head and the inner surface of the pipe being cleaned; and

a removeable flexible heat resistant element, attached to the deflector, having an outer diameter at least as large as the largest inner diameter of the pipe being cleaned.

4,995,202
NOZZLE UNIT AND METHOD FOR USING WET ABRASIVES TO CLEAN HARD SURFACES

Jeffrey G. Gardner, Traverse City, and Dennis J. Gulau, Kingsley, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 26, 1990, Ser. No. 515,146
Int. Cl.[5] B24C *5/04*
U.S. Cl. 51—439 **1 Claim**



1. A nozzle unit for use with wet abrasive materials to clean hard surfaces, the unit comprising:

a first nozzle body having a lengthwise bore therein, the bore defining a venturi structure, and including a fist metallic liner having a receiving end and a discharge end, the receiving end of the liner having a larger diameter than the discharge end of said liner, and the receiving end being connected into a source for supplying an abrasive material to the nozzle unit;

the first nozzle body including a joiner face that is normal to the lengthwise bore, and the discharge end of the metallic liner extending beyond the joiner face;

the first nozzle body further including an annular cavity that surrounds the lengthwise bore, the cavity having an open side along the joiner face, and said nozzle body including an inlet port that communicates with the annular cavity and a source of water;

a second nozzle body having a lengthwise bore therein, the bore defining a venturi structure, and including a second metallic liner with a receiving end, and a discharge end, the receiving end of the liner having a smaller diameter than the discharge end of said liner;

the second nozzle body including a joiner face that is normal to the lengthwise bore, and the first and second nozzle bodies being fastened together at their joiner faces;

the second nozzle body further including a mixing chamber,

the mixing chamber communicating with the discharge end of the first liner, and the receiving end of the second liner;

the first nozzle body including several water passages that connect the annular cavity with the mixing chamber;

the second nozzle body of the second cylindrical part including several air passages that connect the mixing chamber with air surrounding the nozzle unit;

wherein, in operation, an abrasive material is directed into the lengthwise bore of the first nozzle body and is carried into the mixing chamber in the second nozzle body;

water is directed through the inlet port in the first nozzle body, and into the annular cavity therein, and is carried from the annular cavity through the water passages into the mixing chamber;

air is drawn into the mixing chamber through the air passages in the second nozzle body;

the abrasive material, water, and air are mixed together in the mixing chamber, to form a wet abrasive stream; and

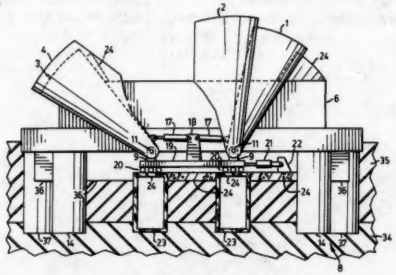
the wet abrasive stream is carried down the lengthwise bore in the second nozzle body, and is discharged from the nozzle unit onto a hard surface to be cleaned.

4,995,203

RETRACTABLE ROOF FOR STADIUM STRUCTURE

Brian Brisbin; Felim McCaffrey, and Peter Sheffield, all of Toronto, Canada, assignors to Stadium Consultants International Inc., Toronto, Canada

Filed Feb. 2, 1990, Ser. No. 474,553
Int. Cl.[5] E04B *1/34*
U.S. Cl. 52—6 **25 Claims**



1. A roof assembly comprising:

a roof structure mounted for rotation about a generally horizontal axis between raised and lowered conditions such that the weight of the roof assembly generates a variable turning moment about said axis dependent on the stage of transition between said conditions, said roof structure in a raised condition covering an area and in a lowered condition uncovering said area;

at least one strut, having upper and lower ends, the upper end being pivotally connected to said roof structure at a distance from said axis;

a body of liquid adjacent the lower end of each strut;

float means, connected to the lower end of each strut, such that displacement of liquid in said body applies a buoyant force to said roof structure through said strut opposite said turning moment when said float means is at least partially immersed in said body of liquid;

guide means for constraining said float means to follow a path within said liquid as said roof structure rotates, such that the total buoyant force, applied through said at least one strut to the roof structure, substantially counterbalances said variable turning moment throughout the transition of the roof structure between its raised and lowered conditions; and

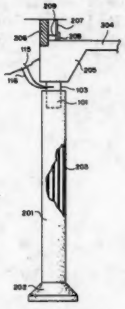
actuating means for rotating said roof structure between said raised and lowered conditions.

4,995,204

FOUNDATION LEVELING SHIM AND SYSTEM

Kenneth J. Kelso, P.O. Box 37222, Houston, Tex. 77036

Filed Feb. 13, 1989, Ser. No. 309,181
Int. Cl.[5] E04B *1/16*
U.S. Cl. 52—126.1 **12 Claims**



2. A foundation leveling pier for leveling a structure on a solid concrete foundation, comprising in combination:

a concrete pier poured in place beneath the structure to be leveled; and

a self contained foundation leveling shim at the upper end of and said pier between said pier and said structure, said leveling shim being placed into said concrete pier before curing with said pier being cured about said leveling shim;

said self contained foundation leveling shim comprising:

an outer cylindrical housing;

a base within the lower end of said housing;

a piston slidably mounted above said base within said housing in sealing engagement with the inner walls of said housing and defining a fluid chamber above said base;

inlet means for injecting a hydraulic fluid between said base and said piston into said chamber; and

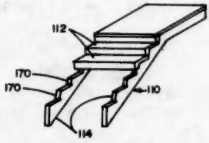
outlet means for removing said hydraulic fluid.

4,995,205

PRECAST STAIR SYSTEM

Eldon R. Bennett, 13011 Cross Creek Blvd., Apt. 82, Fort Myers, Fla. 33912

Filed Mar. 13, 1989, Ser. No. 322,496
Int. Cl.[5] E04F *19/10*
U.S. Cl. 52—189 **24 Claims**



1. A precast stair system comprising:

a plurality of individually precast steps, each step including a tread portion and a riser portion that is integrally connected to said tread portion and extends generally downwardly therefrom;

elongate stringer means that are precast independently of said steps for supporting said steps, said stringer means including a generally horizontal extension portion formed on at least one end for supporting a landing;

means for securing at least one said extension portion to a building which said stair system ascends; and

means for releasably fastening said steps to said stringer means.

4,995,206

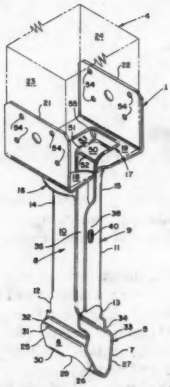
ELEVATED POST BASE

Karen W. Colonias, Lafayette; Alfred D. Commins, Danville; Tyrell T. Gilb, Berkeley; Jin-Jie Lin, Livermore, and Richard D. Moore, Newark, all of Calif., assignors to Simpson Strong-Tie Company, Inc., San Leandro, Calif.

Filed Jul. 11, 1990, Ser. No. 550,961

Int. Cl.[5] E02D *27/00, 27/42, 27/44, 27/50*

U.S. Cl. 52—297 **10 Claims**



1. A metal integral elevated post base formed from a sheet metal blank embedded and supported by a concrete base for supporting a wood post comprising:

a. a metal foot member having upstanding sides adapted for embedment in said concrete base;

b. a pair of metal post members each having side members and each having lower ends individually and respectively integrally connected to said opposite sides of said foot member and adapted for embedment in said concrete base, and having upper ends extending above said concrete base;

c. a pair of base members integrally connected to said upper ends of said post members and extending upwardly and laterally away from said upper ends of said post members;

d. a pair of seat members integrally connected to said base members and forming a support for the end of said wood post; and

e. laterally disposed side members integrally connected to and extending upwardly from said seat members and adapted for attachment to at least two sides of said post member.

4,995,207

AIR-VAPOR BARRIER CONTINUITY DEVICE

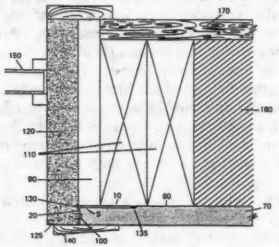
William L. Powis, 1304 13th Street North, Lethbridge, Alberta, Canada (T1H 2T9)

Continuation of Ser. No. 884,543, Jul. 11, 1986, abandoned. This application Nov. 14, 1988, Ser. No. 434,071

Int. Cl.[5] E06B *1/04*

U.S. Cl. 52—210 **14 Claims**

7. In a wall construction around a door or window jamb between the jamb and a wall stud or rough sill, and over and across an airspace between the same, the improvement comprising an air-vapour barrier continuity device, said device comprising a flexible first generally rectangular longitudinal planar member and a second generally rectangular longitudinal planar member, said first member angularly connected at a first back longitudinal edge thereof to said second member along a longitudinal line of said second member whereby said first member extends away from a front longitudinal edge of said second member at an angle greater than 90° to provide



biased contact with said wall stud or rough sill, said second member positioned adjacent the inner wall edge of said jamb, the breadth of said first member being sufficient to extend from said jamb across said airspace to said wall stud or rough sill.

4,995,208

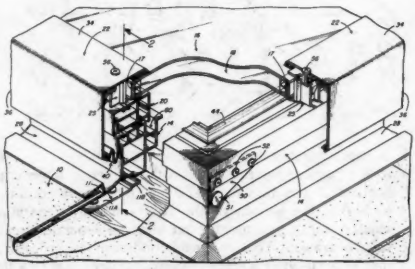
SKYLIGHT CONSTRUCTION

Robert Sampson, Sanford, and Sean Flanigan, Wells, both of Me., assignors to Wasco Products, Inc., Sanford, Me.

Filed Dec. 13, 1988, Ser. No. 283,802

Int. Cl.[5] E04D *13/14*

U.S. Cl. 52—200 **15 Claims**



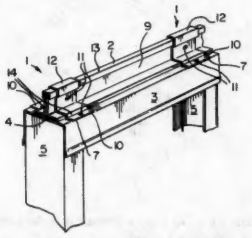
1. A skylight construction for an opening in a building or the like comprising: a frame means extending about the opening and including means securable about the opening, translucent or transparent means covering the opening and extending at edges to overlie the frame means, means for retaining the covering means on the frame means, said means securable about the opening comprising a securing clip adapted to be received in a recess of the frame means and having means for providing positive interlocking with the frame means, as well as means for attachment to the building, said means for providing positive interlocking comprising means defining a channel in said securing clip, said frame means having a hook segment extending into the recess of the frame means, wherein said securing clip, in a first position, is disposed with its end extending into the recess beyond said hook segment, and, in a second position, is disposed so that the hook segment engages in edge defining said channel so as to interlock the securing clip and frame means.

4,995,209

WALL CONNECTOR DEVICE

William Cobb, 75 Queen Alexandra Close S.E., Calgary, Alberta, Canada (T2J 3P9)

Filed Aug. 4, 1989, Ser. No. 389,374
Int. Cl.[5] E04H *1/00*
U.S. Cl. 52—238.1 8 Claims



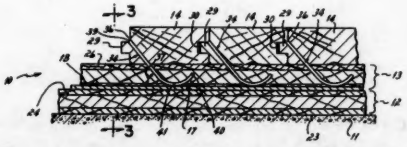
1. A connector device for connecting a generally C-shaped wall channel member to the base of a T-bar used in a conventional suspended ceiling assembly comprising elongated strip means for mounting on the T-bar, in use said strip means having an inverted T-shape, said strip means including a generally inverted U-shaped central portion for straddling and extending downwardly about the stem of the T-bar, and arms means extending outwardly from said central portion beyond the arms of the T-bar for overlying and fastening to the base of the channel member.

4,995,210

FREE FLOATING FLOOR SYSTEM AND METHOD FOR FORMING

Michael Niese, and James H. Stoehr, both of Cincinnati, Ohio, assignors to Robbins, Inc., Cincinnati, Ohio

Continuation-in-part of Ser. No. 162,088, Feb. 29, 1988, Pat. No. 4,831,806. This application May 16, 1989, Ser. No. 352,284
The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.
Int. Cl.[5] E04F *13/08*
U.S. Cl. 52—391 26 Claims



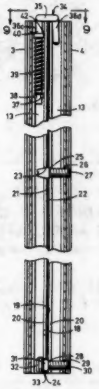
1. A free floating floor system comprising:
an upper subfloor having a bottom surface;
a plurality of flat nail clinching strips underlying said upper subfloor, said bottom surface of said upper subfloor engaging said strips;
a plurality of floorboards disposed on said upper subfloor, said floorboards being substantially coextensive with said upper subfloor; and
a plurality of clinching nails extending through said floorboards and into said upper subfloor above said clinching strips to secure said floorboards to said upper subfloor wherein the clinching strips remain in the floor system.

4,995,211

EDGE-TO-EDGE ATTACHMENT SYSTEM FOR DISPLAY PANELS

John S. Malott, Cincinnati, Ohio, assignor to Downing Displays, Inc., Cincinnati, Ohio

Filed Jan. 25, 1990, Ser. No. 470,300
Int. Cl.[5] E04C *1/30*
U.S. Cl. 52—582 18 Claims



1. An attachment system for joining display panels, each panel having first and second side edges, said first side edge of each panel being joinable with said second side edge of any other of said panels and said second side edge of each panel being joinable with said first side edge of any other of said panels, each of said panels having a body portion, said first and second edges of each panel comprising first and second frame members affixed to said panel body, said first and second frame members being substantially identical, rectilinear and coextensive, said first and second frame members each having a pair of longitudinal sides, an upper end, a lower end, and a longitudinal outer face with abutment surfaces thereon, each of said first and second frame members having a longitudinal opening therein extending from said upper end through said lower end, cooperating means on said first and second frame members of each panel for joining the first and second frame members of adjacent panels near said lower ends thereof, cooperating means on said first and second frame members of each panel, between the upper and lower ends thereof, for aligning said first and second frame members of adjacent panels when joined together, and latch means captively mounted in said opening at the upper end of the same one of said first and second frame members of each panel and shiftable between an inoperative position and an operative position wherein it engages the opening in the other of said first and second frame members of an adjacent panel.

4,995,212

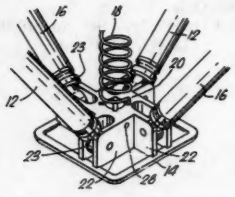
COLLAPSIBLE FRAMEWORK

James N. Morgan, St. Albans, and Simon A. S. Rivers-Bland, London, both of United Kingdom, assignors to Marler Haley Exposystems Limited, United Kingdom

Filed Aug. 4, 1989, Ser. No. 389,402
Claims priority, application United Kingdom, Aug. 4, 1988, 8818550
Int. Cl.[5] E04H *12/18*
U.S. Cl. 52—646 4 Claims

1. A collapsible framework comprising a plurality of spars pivotally connected with hub members, and with one another to form a two-dimensionally expanding linkage, and at least one upright brace, detachably connectable between at least one said hub member and an adjoining said hub member above

it, to brace the linkage in an expanded condition and wherein said upright brace comprises a plurality of rigid lengths detachably connected end-to-end by plug and socket connections and



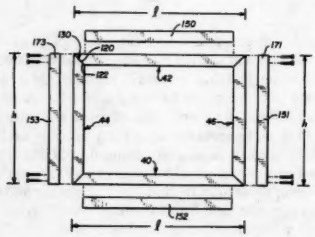
by resilient tensioning means which serve to draw adjacent lengths into interfitting relationship when said lengths are aligned.

4,995,213

FIBERGLASS REINFORCED PLASTIC WINDOW SASH FRAME AND ASSOCIATED METHOD

William P. Bezubic, Indiana, Pa., assignor to Season-All Industries, Inc., Indiana, Pa.

Filed Sep. 13, 1989, Ser. No. 406,686
Int. Cl.[5] E04C *2/38*
U.S. Cl. 52—656 **12 Claims**



1. A window sash frame, comprising:
a plurality of framing members each made of fiberglass reinforced plastic and each having a pair of ends;
said framing members each defining a channel;
a plurality of subframing members, each said subframing member being received in said channel; and
mechanical fastener means securing a first subframing member to an adjacent second subframing member to create a substantially rigid subframe for said window sash frame, whereby said ends of said framing members are drawn towards each other to form said window sash frame having tight fitting corner joints and whereby said subframe is secured to said window sash frame without requiring penetration of fasteners into said window sash frame.

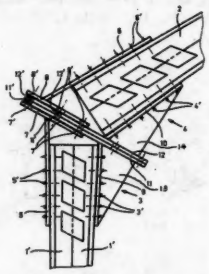
4,995,214

CONNECTING ELEMENT

Johann Wolf, Scharnstein, Austria, assignor to Wolf Systembau Gesellschaft m.b.H. KG., Scharnstein, Austria

Filed Oct. 26, 1988, Ser. No. 262,715
Claims priority, application Austria, Nov. 4, 1987, 2916/87
Int. Cl.[5] E04C *2/38*
U.S. Cl. 52—657 **3 Claims**

1. A truss having a lower end connecting elements for upright wooden columns with an included roof trusses comprising two components (3, 4) one for the upper end of said upright column (1) and the other for the lower end of said inclined roof truss (2), each component comprising a pair of mutually opposed steel bands (5, 9 and 6, 10) one pair of bands (5, 9) being attachable to opposite sides of said column (1) and the other pair of bands (6, 10) being attachable to said roof truss (2) each said pair of steel bands being joined by means of a flange (11 or 12) projecting laterally on all sides past the column (1) and the roof truss (2); means to secure said flanges to each other; and a



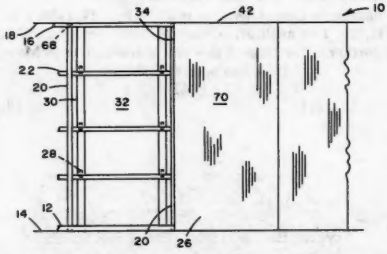
connecting plate (13, 14) interconnecting one band of each said pair of mutually opposed bands and a said flange and disposed in a common vertical plane below said lower end of said roof truss when said flanges are secured to each other.

4,995,215

PANELS WITH LAMINATED STRIPS FOR CLIPS

Robert J. Menchetti, Buffalo, N.Y., assignor to National Gypsum Company, Dallas, Tex.

Continuation-in-part of Ser. No. 299,200, Jan. 23, 1989, Pat. No. 4,976,083. This application Sep. 21, 1989, Ser. No. 410,449
Int. Cl.[5] E04G *21/00, 5/06;* E04B *1/40;* A47B *96/06*
U.S. Cl. 52—747 **6 Claims**



1. The method of mounting wallboard comprising the steps of inserting a back leg portion of each of a plurality of angled suspension clips through thin tear-resistant material, said thin tear-resistant material being adhered to a back face of said wallboard along spaced apart portions of said thin tear-resistant material, said adhering being essentially solely by an adhesive material, inserting each of said clips upwardly through an opening in said thin tear-resistant material into a pocket between said wallboard back face and an unadhered area of said thin tear-resistant material located between said spaced apart adhered portions and immediately above said opening, and subsequently disposing outwardly and downwardly extending hanger legs of said plurality of clips on horizontally extending channel members of a wall framing structure.

4,995,216

BALE WRAPPING CONTROL APPARATUS FOR ROUND BALERS

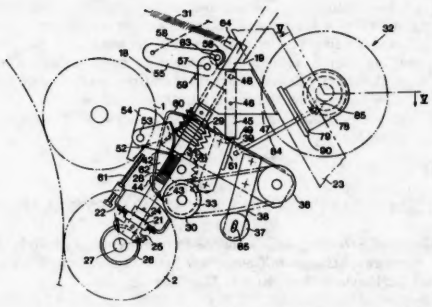
Marc G. Vansteelant, Zedelgem, Belgium, assignor to Ford New Holland, Inc., New Holland, Pa.

Filed Jun. 5, 1989, Ser. No. 361,063

Claims priority, application United Kingdom, Jun. 14, 1988, 88140868

Int. Cl.[5] B65B *11/04, 41/12*

U.S. Cl. 53—64 19 Claims



1. In a round baler having a bale chamber in which cylindrical bales of crop material are formed, a source of bale wrapping material, bale wrapping control means, and cutter means for cutting the wrapping material, said bale wrapping control means comprising:

first drive means operable to drive the cutter means to a position ready for cutting the bale wrapping material;

second drive means operable to determine the length of wrapping material dispensed from the source of wrapping material for wrapping a cylindrical bale and then to initiate operation of the cutter means to effect cutting of the wrapping material dispensed from the source thereof; and

single control means including a driven master shaft rotatable about its longitudinal axis and mounted for rocking movement in opposite directions about a point on its longitudinal axis in order to alternately control the operation of the first and second drive means.

4,995,217

METHOD OF MAKING A CHEMICAL THERMAL PACK

Sam E. Francis, Jr., 5260 Lake Washington Rd., Melbourne, Fla. 32935

Continuation of Ser. No. 136,621, Dec. 22, 1987, Pat. No. 4,856,651. This application Aug. 11, 1989, Ser. No. 392,401

Int. Cl.[5] B65B *9/08, 11/58*

U.S. Cl. 53—410 6 Claims

1. A method of making a thermal pack having a closed top, bottom and side edges, comprising the steps of:

(a) feeding a continuous strip of plastic sheet material from a supply roll, the plastic sheet material having first and second opposed side edges and a longitudinal axis extending in the direction of feeding;

(b) feeding a continuous strip of insulated material from a supply roll and placing it in intimate contact with the strip of plastic sheet material;

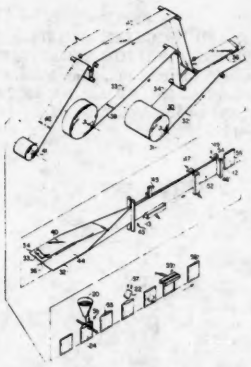
(c) feeding a continuous strip of transparent material from a supply roll and placing it in intimate contact with the strip of insulated material;

(d) folding the strip of plastic sheet material along its longitudinal axis to define a sandwich structure having a fold line at its bottom and an open top;

(e) forming a horizontal weld line along the fold line of the structure;

(f) forming spaced-apart, parallel, double-width vertical weld lines in the structure perpendicular to the fold line;

(g) cutting the vertical weld lines in half to form individual bags having opposed sides, closed opposed side edges, a closed bottom edge, and an open top edge;



(h) opening the top of one of the bags and introducing a portion of heat transfer powder into the interior of the bag;

(i) inserting a rupturable bag pre-filled with liquid into the interior of the bag above the heat transfer powder; and

(j) forming a top weld at the top of the bag to close the top.

4,995,218

METHOD OF PACKAGING A BEVERAGE

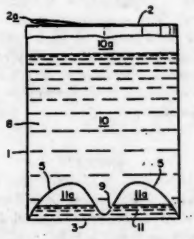
William J. Byrne, Mount Merrion, Ireland, assignor to Arthur Guinness Son & Company (Dublin) Limited, Dublin, Ireland

Filed Apr. 28, 1989, Ser. No. 345,209

Claims priority, application United Kingdom, Sep. 12, 1988, 8821264

Int. Cl.[5] B65B *31/00, 3/02, 29/06;* B65D *85/72*

U.S. Cl. 53—410 14 Claims



1. A method of packaging a beverage having gas in solution therewith which comprises providing an open topped container and charging the container with the beverage; locating a partition wall having a restricted orifice over the beverage in the container to form a primary chamber within which the beverage is contained and which primary chamber is sealed other than for said orifice; locating a closure wall over the partition wall to provide a sealed package in which the closure wall forms with the partition wall a secondary chamber which is sealed other than for the restricted orifice through which the secondary chamber communicates with the primary chamber, and which further comprises subjecting the container over the

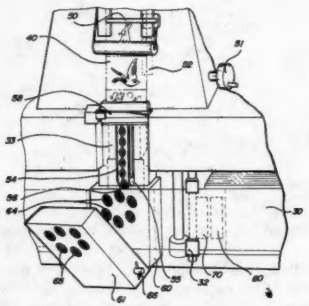
beverage to a gasifying medium prior to sealing the package so that a gas pressure greater than atmospheric is provided in the sealed package and inverting the sealed package so that the beverage enters the secondary chamber from the primary chamber through said restricted orifice to form a primary headspace in the primary chamber and a secondary headspace in the secondary chamber when the gas and beverage are at equilibrium.

4,995,219

COMBINATION CUTTER AND BAGGER FOR PHOTOGRAPHIC NEGATIVES

Ray T. Hicks, 2605 Corunna Rd., Flint, Mich. 48503-3362

Filed Dec. 13, 1989, Ser. No. 450,203
Int. Cl.[5] B65B *63/00, 5/08, 35/28, 43/30*
U.S. Cl. 53—411 **18 Claims**



1. A device for cutting photographic film into individual negatives and placing said individual negatives into individual continuous feed storage envelopes, each said envelope having a first face base side and a second face opening side, said device having cutting means for severing said photographic film into individual negatives, means for transferring said negatives to said envelopes and means for opening said envelopes for insertion of said individual negatives, wherein said means for opening said envelopes comprises:

a track for supporting a plurality of continuous feed storage envelopes;

a first suction assembly having a stationary operating position operative to direct a flow of air away from said first face of one envelope at a time causing a vacuum to secure said envelope with respect to said track; and

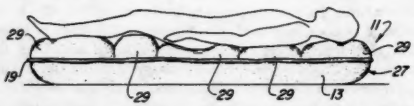
a second independent suction assembly having a stationary operating position operative to direct a flow of air away from said second face of said envelope causing a vacuum to open said envelope.

4,995,220

METHOD OF MAKING A THERAPEUTIC MATTRESS

Charles R. Thomas, 120 E. Golden Gate, Detroit, Mich. 48203

Division of Ser. No. 242,525, Sep. 12, 1988, Pat. No. 4,922,564.
This application Feb. 12, 1990, Ser. No. 478,364
Int. Cl.[5] B65B *1/20, 43/02, 51/07*
U.S. Cl. 53—418 **2 Claims**



1. The method of making a therapeutic mattress comprising the steps of:

taking a first sheet of fabric material of rectangular shape;

taking a second sheet of fabric material and folding it over to provide a top cover and an underlying intermediate bottom fabric cover of the same dimensions as said first sheet;

applying a plurality of parallel spaced rows of stitching across the width of said top and intermediate bottom cover;

superimposing the folded cover second fabric sheet over the first fabric sheet;

peripherally stitching the top fabric cover, the intermediate bottom fabric cover and bottom fabric cover together defining a series of rectangular tubes within the top cover and intermediate bottom cover, and a unit chamber between the bottom intermediate cover and the bottom cover;

stuffing, filling, compacting and retaining a fibrous material within said plurality of rectangular tubes, defining a plurality of firm resilient top mattress sections;

stuffing, filling, retaining a resilient fabric material within said chamber defining a bottom mattress section supportably underlying said top mattress sections; and

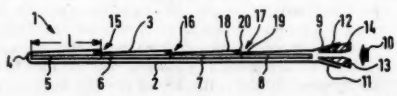
transversely stitching closed the open ends of said tubes and chamber.

4,995,221

FILM JACKET FOR FLAT ARTICLES, PARTICULARLY SLIDE FRAMES

Gottfried Stemmer, Jr., Garmisch-Partenkirchen, Fed. Rep. of Germany, assignor to Geimuplast Peter Mundt GmbH & Co. KG., Farchant, Fed. Rep. of Germany

Division of Ser. No. 168,770, Mar. 16, 1988, Pat. No. 4,848,576.
This application May 8, 1989, Ser. No. 348,505
Claims priority, application Fed. Rep. of Germany, Mar. 18, 1987, 3708880
Int. Cl.[5] B65B *43/04, 43/30*
U.S. Cl. 53—455 **11 Claims**



1. A process for jacketing flat articles, comprising:

joining top and bottom film plies at one end and at opposite side edges, the top and bottom film plies including forward ends which together form an opening between said plies opposite said one end,

providing one of said top and bottom film plies with a plurality of transversely extending slits extending between said opposite side edges and substantially parallel to said one end,

spacing one of said slits apart from said one end by a distance corresponding to the length of one of said flat articles,

spacing each remaining slit apart from another said slit by the same distance,

inserting each of said flat articles in succession through said opening into said film jacket, and

withdrawing the flat articles individually through one of said transversely extending slits.

4,995,222

AMPOULE SEALING APPARATUS

Charles R. Whitman, Ross Township, Kalamazoo County, and John J. Dougherty, Jr., Paw Paw, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Jan. 8, 1990, Ser. No. 462,128
Int. Cl.[5] B65B *31/02, 1/22, 51/10*
U.S. Cl. 53—510 **7 Claims**

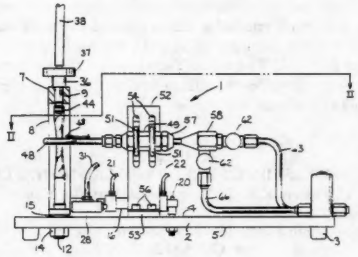
1. An ampoule sealing apparatus comprising:

means for receiving an unsealed ampoule;

means for pivotably moving said unsealed ampoule sequen-

tially from a first position to a second position and back to said first position;

means for vibrating said unsealed ampoule at said first position;



means for pulling a vacuum on said unsealed ampoule at both of said positions and removing air therefrom; and

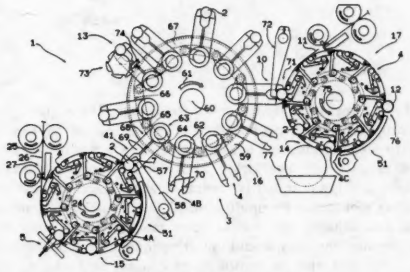
means for heating and sealing said ampoule at said second position.

4,995,223

CONTINUOUS WRAPPING MACHINE

Mario Spatafora, and Antonio Gamberini, both of Bologna, Italy, assignors to G.D. Societa' per Azioni, Bologna, Italy

Filed Mar. 14, 1990, Ser. No. 494,133
Claims priority, application Italy, Mar. 14, 1989, 3376 A/89
Int. Cl.[5] B65B *11/04*
U.S. Cl. 53—176 **8 Claims**



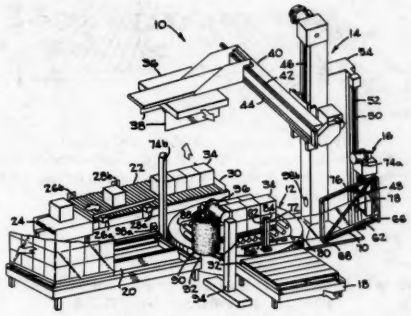
1. A continuous wrapping machine comprising a number of seats (4), each designed to receive a respective unwrapped product (2); first conveying means (3) for successively feeding said seats (4) at constant speed along a predetermined route; and a number of work stations (5, 13) located along said route; a first (5) of said stations being designed to feed a said product (2) inside each said seat (4), together with a respective portion (6) of wrapping material, for forming, about said product (2), at least a first tubular wrapping (7) comprising two opposite end portions (8) projecting from the respective ends (9) of said product (2); and a second (13) of said stations being designed to close said end portions (8) of each said tubular wrapping (7) about the respective ends (9) of said product (2); characterised by the fact that said second work station (13) is located in a fixed position along said route, and that second conveying means (68) are provided, at least along a portion of said route extending through said second station (13), for reversing each said seat (4), in said second station (13), in relation to said first conveying means (3) and at said travelling speed.

4,995,224

STRETCH WRAPPING PALLETIZER

Ray A. Yourgalite, Hoopeston, Ill.; Malcolm Moore, Green Bay, Wis.; Neal C. Chamberlain, Hoopeston, Ill.; Kenneth F. Becicka, Alvin, Ill.; Samuel J. Hilgeman, Hoopeston, Ill., and Kevin D. Moore, Potomac, Ill., assignors to FMC Corporation, Chicago, Ill.

Continuation of Ser. No. 167,949, Mar. 14, 1988, abandoned.
This application Dec. 5, 1989, Ser. No. 445,936
Int. Cl.[5] B65B *11/04*
U.S. Cl. 53—540 **2 Claims**



1. Apparatus for creating a unitized stack of articles by alternately forming a layer of articles and wrapping said layer of articles without the need for an article guide frame and wherein a portion of the stack of articles is free standing the stack is unitized, the apparatus comprising:

an elevatable turntable for supporting said stack of articles, said elevatable turntable receiving a layer of articles and then being lowered to receive a subsequent layer of articles;

a palletizer cooperating with said elevatable turntable for stacking a layer of said articles on said turntable or on a previously deposited layer of articles;

wrap means serving means for serving wrap means to said turntable to wrap a layer of articles unsupported by a guide frame while said turntable is rotated after said palletizer has located said articles to form a layer of articles on said turntable or on a previously formed layer of articles and prior to said palletizer locating subsequent articles on said previously deposited articles;

cutting element means for severing said wrap means after said wrap means serving means has served wrap means to multiple layers of articles stacked on said turntable by said palletizer.

4,995,225

COMPACT FOOD TRAY FILM WRAPPING MACHINE

Frank Terminella; Manuele Terminella, and William Stroud, all of Fayetteville, Ark., assignors to Pacmac, Inc., Fayetteville, Ark.

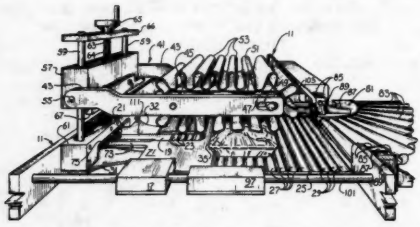
Filed Sep. 7, 1989, Ser. No. 404,215
Int. Cl.[5] B65B *11/18*
U.S. Cl. 53—556 **15 Claims**

1. In a food tray film wrapping machine having a wrapping station and having film folding arms to fold edges of the film under the tray at said wrapping station, the improvement comprising

a powered conveyor for receiving said trays from one side of said wrapping station and moving them along a path with a predetermined final direction of travel,

a tray pusher bar and means for actuating said pusher bar following the operation of said folding arms to push a tray from said wrapping station at right angles to said final direction of travel onto said conveyor, and

an endless belt looped around two freely rotatable end rollers and means for mounting said belt and rollers above said wrapping station with said belt extending in a direction transverse to said final direction of travel and with



partially restrained freedom of vertical movement of said belt thereby causing it to exert downward force on a tray being displaced from said wrapping station by said pusher bar while rotated only by motion of said tray.

4,995,226

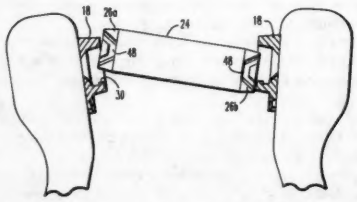
SAFETY STIRRUP

George F. Kuhn, Jr., 721 Harrison City Rd., Trafford, Pa. 15085

Filed Jul. 10, 1989, Ser. No. 377,721

Int. Cl.[5] B68C *3/02*

U.S. Cl. 54—49 **13 Claims**



1. A safety stirrup comprising a substantially U-shaped flexible bottom frame, said U-shaped frame including a foot rest portion and a pair of side members extending upwardly from said foot rest portion, hollow hub means affixed to said U-shaped frame on the interior side thereof proximate the ends of said U-shaped frame, rotatable axle means extending horizontally between said hub means, said axle means including substantially cylindrical solid hub engaging end portions, said axle end portions being housed within said hub means, said hub means on the interior surface thereof having a nub means affixed thereto protruding radially inwardly at the lowest point on said interior surface of said hub means in predetermined position, one of said axle end portions having a first U-shaped nub engaging channel therein on the underside thereof, the other of said axle end portions having a second U-shaped nub engaging channel therein on the underside thereof, said first U-shaped channel opening towards the adjacent end of said axle means, said second U-shaped channel opening towards the other end of said axle means, said first U-shaped channel and said second U-shaped channel each being bisected by an imaginary coaxial line extending along the lowest point on the underside of said axle means between the ends of said axles, said first U-shaped channel and said second U-shaped channel each having a central locking portion, said central locking portion of said first U-shaped channel and said central locking portion of said second U-shaped channel being in substantial parallel relationship and substantially equally distant from the respective ends of said axle means, said first U-shaped channel and said second U-shaped channel each having nub camming and receiving portions adjacent each side of said central locking portion, said nub camming and receiving portions each forming a nub receiving notch in said ends of said axle means, whereby when said U-shaped flexible bottom frame member is rotated to the extent said nub means enters said nub camming and receiving portions of said U-shaped channel, said side members of said frame member are caused to simultaneously spread apart until said nub means exits said U-shaped channel via said nub receiving notch, thereby disengaging said frame member from said axle means thereby permitting a horseback rider's foot to be released from said stirrup to prevent the possibility of serious injury.

4,995,227

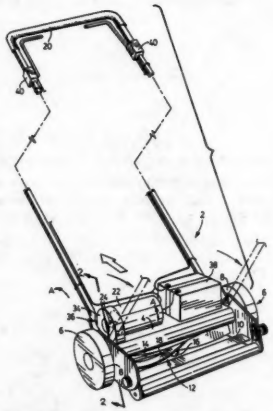
POWER ASSISTED REEL TYPE LAWN MOWER

Harry C. Foster, R.R. 1, Georgetown, Ontario, Canada L7G 4S4

Filed Oct. 25, 1989, Ser. No. 426,207

Int. Cl.[5] A01D *35/24*

U.S. Cl. 56—249 **16 Claims**



1. In a reel-type lawn mower for cutting lawns, including cutting reel means propelled in a first direction by electric motor means connected to said cutting reel means by transmission means upon energizing said electric motor means for cutting said lawn, and; drive wheel means engageable with said cutting reel means by unidirectional clutch means for propelling said cutting reel means upon manually activating said drive wheel means and said uni-directional clutch means so as to assist said electric motor in propelling said cutting reel means when greater cutting speeds of said cutting reel means is required than delivered by said electric motor means and where said drive wheel means are disengageable with said cutting reel means through said unidirectional clutch means where said electric motor means provides sufficient cutting speed to propel said cutting reel.

4,995,228

CUTTING BLADE FOR ROTARY CUTTING MACHINERY

Joseph C. Hladik, Jr., R.R. #1, P.O. Box 145A, Hennessey, Okla. 73742

Filed Apr. 30, 1990, Ser. No. 516,973

Int. Cl.[5] A01D *34/73*

U.S. Cl. 56—255 **4 Claims**

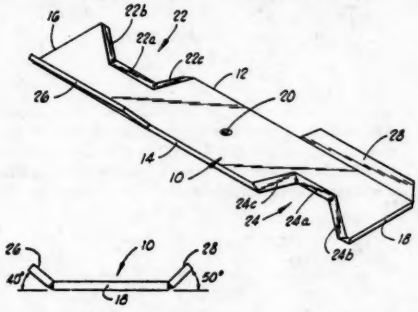
1. A rotary cutting blade comprising:

an elongated metallic plate having a pair of opposed, parallel longitudinal side edges defining between them the width of the blade, and having a pair of opposite ends

means at substantially the center of the plate for mounting the plate on a rotating power shaft;

a first trapezoidally-shaped cutting recess opening into the plate from one of said longitudinal side edges at a location adjacent one of the ends of the plate, said first cutting recess having an internal sharpened cutting edge extending parallel to said one longitudinal side edge, and having a pair of diagonal cutting edges extending from said internal cutting edge to said one longitudinal cutting edge, each of said diagonal cutting edges extending at an angle of from about 40° to about 50° to said internal cutting edge;

a second trapezoidally-shaped cutting recess opening into the plate from the other of said longitudinal side edges at a location adjacent the other end of the plate which is opposite the end nearest said first cutting recess, said



second cutting recess having an internal sharpened cutting edge extending parallel to said longitudinal side edges, and having a second pair of diagonal cutting edges extending from the internal cutting edge of said second recess to said other longitudinal cutting edges, each of said diagonal cutting edges extending at an angle of from about 40° to about 50° to the internal cutting edge of said second recess;

a first turbulence flange secured to said one longitudinal edge at a location directly across said plate from said second cutting recess and extending upwardly from said plate at an angle of from about 40° to about 50°; and

a second turbulence flange secured to said other longitudinal edge at a location directly across said plate from said first cutting recess and extending upwardly from said plate at an angle of from about 40° to about 50°.

4,995,229

PROCESS AND AN ARRANGEMENT FOR PICKING UP A YARN END OF A SPOOL PACKAGE DURING A PIECING OPERATION

Fritz Stahlecker, Bad Ueberkingen, Fed. Rep. of Germany, assignor to Hans Stahlecker, Fed. Rep. of Germany, a part interest

Filed Aug. 21, 1989, Ser. No. 396,348

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1988, 3828323

Int. Cl.[5] D01H *1/115, 15/013*

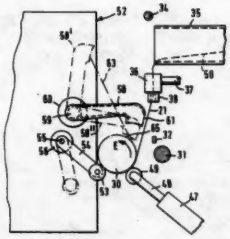
U.S. Cl. 57—261 **23 Claims**

1. A process for retrieving a yarn end being wound onto a spool package during a piecing operation at a spinning unit of the type supplying two adjacent prestrengthened yarns to form said spool package, said process comprising:

detecting breakage of one of the prestrengthened yarns,

interrupting winding onto the spool package in such a manner that the unbroken prestrengthened yarn is disposed in a predetermined yarn pick-up position,

applying a suction gripper to the unbroken prestrengthened yarn at said predetermined yarn pick-up position and moving the suction gripper and unbroken yarn to a position withdrawing the broken yarn and from the spool package for a first piecing attempt, and



applying the suction gripper to adjacent the circumference of the spool package at a position spaced from the predetermined yarn pick-up position to locate the broken yarn end in the event of an unsuccessful first piecing attempt.

4,995,230

STEAM SETTING SYSTEM FOR SPINNING BOBBIN

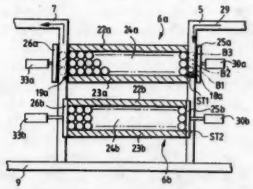
Shoichi Tone, Kyoto, and Masaharu Kirisake, Joyo, both of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Oct. 12, 1988, Ser. No. 256,599

Claims priority, application Japan, Oct. 19, 1987, 62-264775; Feb. 19, 1988, 63-38436

Int. Cl.[5] D01H *13/32*

U.S. Cl. 57—281 **1 Claim**



1. In a bobbin transferring system for transferring bobbins along a path, the improvement comprising:

a steam setting device arranged along the bobbin path, the steam setting device comprises a housing having an interior suitable for accommodating a plurality of bobbins, simultaneously, a bobbin inlet and a bobbin outlet;

a first bobbin conveyor extending toward the bobbin inlet, and a second bobbin conveyor extending from the bobbin outlet;

a bobbin reservoir arranged along the first bobbin conveyor;

wherein the bobbins transferred along the path are conveyed by the first conveyor to the bobbin inlet and by the second conveyor from the bobbin outlet;

stopping means for stopping bobbins conveyed by the first conveyor adjacent the bobbin inlet of the steam setting device; and

bobbin transferring means for transferring bobbins stopped by the stopping means into the housing of the steam setting device through the bobbin inlet;

wherein the bobbin transferring means comprises a movable door movable adjacent the bobbin inlet between an open position, at which the bobbin inlet is open, and a closed position, at which the bobbin inlet is traversed by the door, wherein the movable door comprises a surface which is arranged to contact and push bobbins stopped by the stopping means through the bobbin inlet upon the movable door being moved to the closed position.

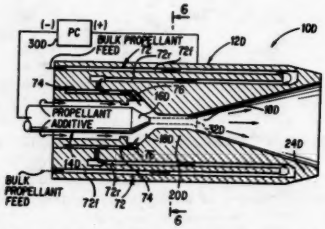
4,995,231
PERFORMANCE ARCJET THRUSTER

Richard D. Smith, Kirkland; Steve Knowles, Seattle; R. J. Cassady, Bellevue; William Smith, Seattle, and Mark A. Simon, Redmond, all of Wash., assignors to Olin Corporation, Stamford, Conn.

Division of Ser. No. 150,591, Feb. 1, 1988, Pat. No. 4,926,637. This application Sep. 25, 1989, Ser. No. 411,798

Int. Cl.[5] F02K *11/00*

U.S. Cl. 60—203.1 **12 Claims**



1. In an arcjet thruster, the combination comprising:

(a) a body forming an annular-shaped constrictor and an annular-shaped nozzle being tandemly-arranged and having respective surfaces which together define an arc chamber, at least said nozzle being electrically conductive to constitute an anode;

(b) an elongated member having a tip disposed adjacent to and spaced upstream from said constrictor, said member being electrically conductive to constitute a cathode spaced from said anode by a gap generally coextensive with said arc chamber;

(c) means for applying an electrical potential to said anode and cathode so as to generate an electrical arc in said arc chamber from said cathode to said anode which produces thermal heating of propellant gases flowing through said chamber and expansion thereof through said nozzle; and

(d) means for separately injecting a separately supplied bulk propellant having a first specific impulse and a propellent additive having a second specific impulse greater than said first specific impulse into said arc chamber in the region of said tip of said cathode, said injecting means including means for injecting the propellant additive from along the exterior of said cathode into said arc chamber at the region of said cathode tip and into a central region of the arc formed between said cathode and anode.

4,995,232
RUNNING CONTROL FOR A GAS TURBINE ENGINE

Arthur E. Sutton, Birmingham, England, assignor to Lucas Industries, Birmingham, England

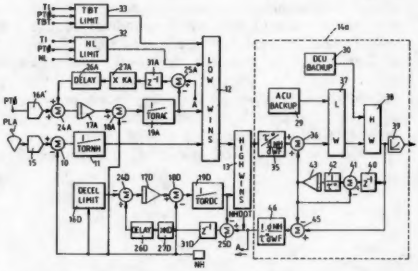
Filed Aug. 4, 1986, Ser. No. 901,039

Claims priority, application United Kingdom, Aug. 2, 1985, 8519454

Int. Cl.[5] F02K *3/00*

U.S. Cl. 60—243 **4 Claims**

1. In a running control for a gas turbine engine having a fuel flow control which receives as input a signal representing a desired rate of change of engine speed, a speed governor circuit which receives a demand speed signal and an actual speed signal and provides a first output signal determined by the difference between said speed signals, an acceleration control circuit and a deceleration control circuit, each control circuit including a limit signal generator the output of which represents the maximum permitted rate of change of engine speed in current operating conditions and each control circuit also including an integrator connected to integrate the output of the respective limit signal generator and means for generating second and third output signals determined by the difference between the output of the respective one of the integrators and the actual engine speed, selection means for selecting whether the first, second or third output signal is applied to the fuel flow control as the input thereof and means for resetting the integrators of the acceleration and deceleration control circuits, the improvement wherein the integrator resetting means



of at least one of the acceleration and deceleration control circuits comprises a feedback arrangement which modifies the input to the integrator of that control circuit in accordance with the difference beween the input to the fuel flow control and the second or third output signal as the case may be.

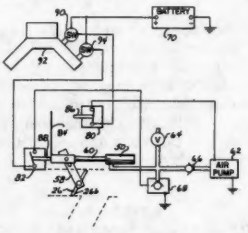
4,995,233
AUTOMATICALLY CONTROLLED EXHAUST ASSEMBLY FOR MARINE STERN DRIVE

Ricky H. Lulloff, Neenah, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Feb. 7, 1990, Ser. No. 476,352

Int. Cl.[5] B63H *21/32*

U.S. Cl. 60—324 **14 Claims**



1. A stern drive marine propulsion system for a boat having a transom, comprising:

an inboard engine with an exhaust;

an outboard drive unit and propeller operatively coupled to said engine and separated therefrom by said transom;

an exhaust control assembly aft of said engine exhaust and forward of said transom, said assembly having an inlet connected to said engine exhaust, and having first and second outlets, and a valve in said assembly having a first condition providing communication of said inlet with said first outlet, and a second condition blocking communication of said inlet with said first outlet;

first passage means connected to said first outlet and extending aft through said transom;

second passage means connected to said second outlet and extending aft through said transom;

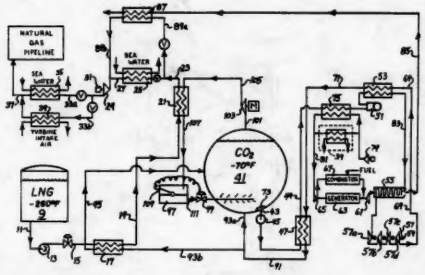
automatic control circuitry for automatically controlling actuation of said valve between said first and second conditions in response to a given parameter.

4,995,234

POWER GENERATION FROM LNG

Richard J. Kooy, Western Springs; John S. Andrepont; Roger F. Gyger, both of Naperville, all of Ill., and Lewis Tyree, Jr., Lexington, Va., assignors to Chicago Bridge & Iron Technical Services Company, Plainfield, Ill.

Filed Oct. 2, 1989, Ser. No. 415,649
Int. Cl.[5] F01K *25/10*
U.S. Cl. 60—648 19 Claims



1. A method for generating power from LNG and storing energy , which method comprises

providing a source of LNG at a temperature of about −250° F. or lower,

increasing the pressure of said LNG to at least about 400 psia,

creating a reservoir of carbon dioxide liquid at about the triple point thereof which reservoir contains a substantial amount of solid carbon dioxide,

vaporizing said LNG to natural gas by removing heat from CO_2 at about the triple point temperature,

heating said high pressure natural gas,

expanding said heated natural gas to create rotary power, and

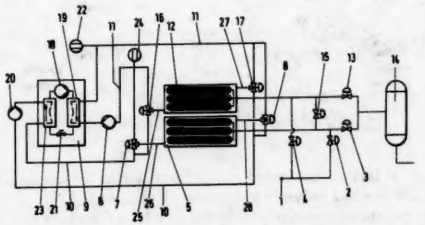
employing the carbon dioxide in said reservoir in a useful manner which results in the creation of CO_2 vapor that is subsequently reliquefied.

4,995,235

METHOD AND APPARATUS FOR COMPRESSING HYDROGEN GAS

Clemens Halene, Düsseldorf, Fed. Rep. of Germany, assignor to Huit Gesellschaft Fur-Hydrid-Und Wasserstofftechnik m.b.H., Fed. Rep. of Germany

Filed Mar. 17, 1989, Ser. No. 325,267
Claims priority, application Fed. Rep. of Germany, Mar. 17, 1988, 3809680
Int. Cl.[5] F17C *11/00*
U.S. Cl. 62—46.2 24 Claims



1. Apparatus for compressing hydrogen gas comprising:

a hydrogen source;

hydrogen receiver means;

at least one hydride reservoir means;

said hydride reservoir means having means for receiving said hydrogen gas from said hydrogen source at a first pressure and for discharging said hydrogen gas to said hydrogen receiver means at a second pressure;

said second pressure being substantially higher than said first pressure;

said hydride reservoir means including means for supplying a heating and cooling medium thereto and means for discharging said heating and cooling medium therefrom;

heat sink means;

heat pump means operably connected to said hydride reservoir means through said means for supplying and said means for discharging said heating and cooling medium and to said heat sink means for selectively cooling said hydride reservoir means while heating said heat sink means and heating said hydride reservoir means while cooling said heat sink means; and

said heat sink means including means for receiving heat during said heating, means for storing said received heat, and means for releasing a substantial portion of said received heat during said cooling; and

said heat pump means being configured to provide said heating of said hydride reservoir means for generating a pressure of said hydrogen gas of said hydride reservoir means at least as great as said second pressure.

19. A method of compressing hydrogen gas, said method comprising the steps of:

supplying said hydrogen gas at a first pressure to at least one hydride reservoir means;

transferring heat with heat pump means from said hydride reservoir means to a heat sink means to cause said hydrogen gas to be absorbed in said hydride reservoir means;

receiving said heat in said heat sink means;

transferring said heat with said heat pump means to said hydride reservoir means from said heat sink means to cause a discharge of said hydrogen gas at a second pressure which is higher than said first pressure; and

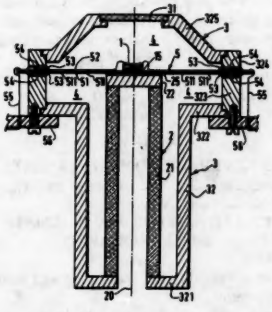
removing said hydrogen gas at said second pressure from said hydride reservoir means.

4,995,236

CRYOSTATIC DEVICE FOR A RADIATION DETECTOR

Pierre Rouquier, Versailles; Michel Pele, Saint-Benoit; André Ic, Dourdan, and Pierre Crestey, Biard, all of France, assignors to Société Anonyme de Telecommunications, France

Filed Oct. 11, 1989, Ser. No. 420,154
Claims priority, application France, Oct. 13, 1988, 88 13470
Int. Cl.[5] F25B *19/00*
U.S. Cl. 62—51.1 8 Claims



1. A cryostatic device for a radiation detector, comprising:

(a) a cooled finger extending along an axis and having an end supporting at least one detector for detecting radiation and for generating a signal indicative of the detected radiation;

(b) a case surrounding said finger and said detector and

transparent to said radiation at least in the vicinity of said detector, said case forming about said finger and said detector a heat insulating enclosure; and

(c) feed-through means for conveying said signal from the detector outside said enclosure, including

(i) a disk made from an electrically insulating material, and extending in a plane perpendicular to the axis of said finger, said disk having a central portion fixed to said end of the finger and a peripheral portion fixed to said case, said peripheral portion passing through and beyond said case for radially immobilizing said end of the finger with respect to said case, and

(ii) a plurality of conductors supported by said disk for conveying said signal.

4,995,237

METHOD FOR CARRYING OUT MAINTENANCE WORK ON A REFRIGERATOR, DEVICE AND REFRIGERATOR FOR CARRYING OUT THE METHOD

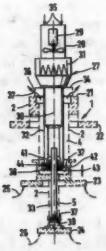
Wilhelm Strasser, Bergisch Gladbach, Fed. Rep. of Germany, assignor to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

Filed Oct. 20, 1987, Ser. No. 110,936

Claims priority, application Fed. Rep. of Germany, Oct. 20, 1986, 3635604

Int. Cl.[5] F25D *17/06*

U.S. Cl. 62—93 **12 Claims**



1. A method for performing maintenance on structural components located within a refrigerator housing while preventing condensation of gases in the refrigerator, said refrigerator housing having two sections separable from each other for accessing the refrigerator interior, the maintenance being carried out by first opening the housing, completing the maintenance, and thereafter closing the housing then sweeping the housing with a working gas, the method comprising heating local areas of the refrigerator housing endangered by condensation to a temperature prior to the maintenance which ensures that the maintenance and working gas sweep of the housing will be completed before the local area temperature falls below the dew point of condensable gases.

4,995,238

CHILLED BEVERAGE CONTAINER DISPLAY BIN

Leslie C. King, Snellville, Ga., assignor to Leggett & Platt, Incorporated, Carthage, Mo.

Filed May 31, 1990, Ser. No. 530,998

Int. Cl.[5] F25B *49/00*

U.S. Cl. 62—125 **8 Claims**

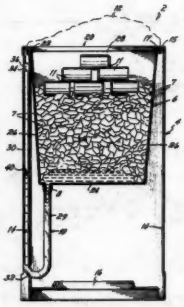
4. A container assembly for containing and displaying iced products comprising

a hollow, open top, self-supporting body having a bottom, a sidewall, and an open top, said bottom of said self-supporting body being adapted to be floor supported,

a liquid impervious storage tank supported from and contained internally of the self-supporting body, said storage tank having a bottom, a sidewall, and an open top, the bottom of the storage tank being located in a plane substantially above the bottom of the self-supporting body,

a drainage opening located near the bottom of the storage tank, and

a flexible drainage hose having one end portion located internally of the self-supporting body and an opposite end portion located externally of the self-supporting body, said one end portion of said hose having a first end connected to the drainage opening of said storage tank and said opposite end portion of said hose having a second end releasably supported near the top of said self-supporting body, by a releasable support means whereby said hose functions as a telltale of the level of liquid in said storage tank while supported near the top of said self-supporting body and facilitates draining of liquid from said storage tank without the provision of a flow control valve when not supported near the top of said self-supporting body.



4,995,239

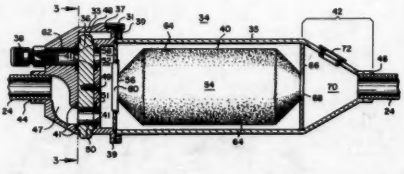
LIQUID LINE SERVICE AND PROCESS DEVICE

Michael D. Carey, Holmen, Wis., assignor to American Standard Inc., New York, N.Y.

Filed May 4, 1990, Ser. No. 519,071

Int. Cl.[5] F25B *45/00*

U.S. Cl. 62—149 **11 Claims**



1. A liquid line service and process device for use in the liquid line of a refrigeration system comprising:

a housing, respectively including an inlet, a filter core and an outlet forming a refrigerant flow path through the housing; the housing also including an access port, means for connecting the access port to the refrigerant flow path, a moisture indicator in the refrigerant flow path, and means for controlling the flow of refrigerant in said flow path.

4,995,240

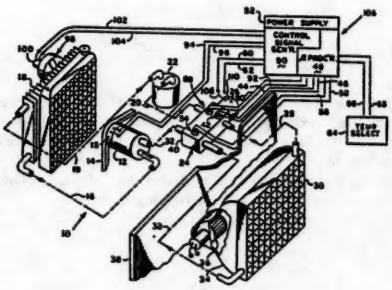
CONTROLLING REFRIGERATION HAVING CONTROL MODULE DIRECTLY ATTACHED ON VALVE BODY

Richard C. Barthel, Harwood Heights; Peter J. Malone, Rosemont, both of Ill.; Charles D. Orth, Cedarburg, Wis., and George W. Jarosch, Elkgrove, Ill., assignors to Eaton Corporation, Cleveland, Ohio

Division of Ser. No. 210,159, May 2, 1988, Pat. No. 4,848,100, which is a continuation of Ser. No. 7,147, Jan. 27, 1987, abandoned. This application Jun. 6, 1989, Ser. No. 362,138

Int. Cl.[5] F25B *49/00*

U.S. Cl. 62—225 4 Claims



1. A controller assembly for controlling refrigerant flow in a vehicle air conditioning system comprising:

(a) valve body means defining an inlet adapted to receive pressurized refrigerant, an outlet adapted for discharging said refrigerant at a lower pressure and a valving passage therebetween having therein a valve member movable between an open and closed position for controlling flow in said passage between said inlet and outlet;

(b) motor means attached to said body means and operable upon periodic energization to move said valve member between said open and said closed position, said motor means having at least one electrical connector extending therefrom;

(c) a first temperature sensing means attached to said body means and operative, upon electrical energization, for sensing the temperature in said outlet, said sensing means having at least one electrical connector extending therefrom;

(d) said body means further defining an auxiliary passage therethrough, said auxiliary passage adapted for having refrigerant leaving an evaporator flow therethrough;

(e) second temperature sensing means attached to said body means and operative, upon electrical energization for sensing the temperature in said auxiliary passage, said second sensing means having at least one electrical connector extending therefrom;

(f) control circuit means comprising a module including a microcomputer and means operable to periodically energize said valve, said module attached to and in direct contact with said body means which has for heat conduction therewith, said module having receptacle means received therein, in plug-in arrangement, said motor electrical connector and said electrical connectors of said first and second temperature sensing means; and,

(g) electrical supply connector means provided on said module and adapted for connection to an on-board source of electrical power.

4,995,241

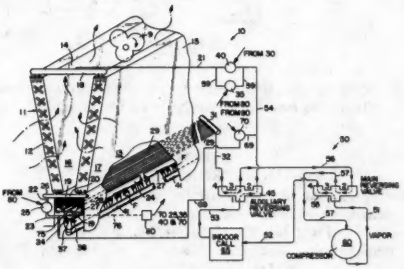
HIGH EFFICIENCY HEAT EXCHANGER

Gerry Vandervaart, Nigara Falls, Canada, assignor to Kool-Fire Limited, Niagara Falls, Canada

Filed Sep. 13, 1989, Ser. No. 406,409

Int. Cl.[5] F25B *27/00*

U.S. Cl. 62—238.7 34 Claims



1. A heat exchanger comprising outdoor coil means for circulating a heat-exchange medium therethrough, said outdoor coil means having an inlet and an outlet for respectively receiving and discharging the heat-exchange medium therefrom, compressor means for compressing a vapor phase of the heat-exchange medium, means for effecting ambient air flow relative to said outdoor coil means during a heating phase of said heat exchanger whereby the heat-exchange medium absorbs heat from ambient air to elevate the temperature of said heat-exchange medium, means for generating heat to further increase the temperature of the heat-exchange medium beyond that created by the heat absorbed from ambient air, control means for at times simultaneously operating said ambient air flow effecting means and said heat-generating means, accumulator means for receiving the heat-exchange medium in its liquid phase from said outdoor coil means outlet and collecting the liquid phase heat-exchange medium therein, said heat-generating means being effective for heating the liquid phase of the heat-exchange medium while collected in said accumulator means and transforming the liquid phase heat-exchange medium into its vapor phase, means for conducting the heat-exchange medium vapor phase from said accumulator means to said compressor means whereby the vapor phase of the heat-exchange medium is compressed, and means for conducting the compressed vapor phase of the heat-exchange medium from said compressor means to said indoor coil means inlet.

4,995,242

METHOD OF AND MEANS FOR CONTROLLING THE CONDITION OF AIR IN AN ENCLOSURE

Gad Assaf, Rehovot, Israel, assignor to Ormat Turbines, Ltd., Yavne, Israel

Continuation of Ser. No. 479,009, Mar. 23, 1983, abandoned, which is a continuation-in-part of Ser. No. 377,368, Jul. 30, 1982, abandoned. This application Jan. 6, 1989, Ser. No. 294,114

Int. Cl.[5] F25D *23/00*

U.S. Cl. 62—271 15 Claims

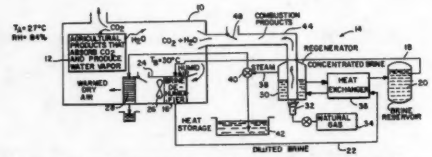
1. Apparatus for controlling the condition of air in an enclosure comprising:

(a) a brine dehumidifier to which concentrated brine is supplied from a reservoir and from which diluted brine is obtained;

(b) means for recirculating air in the enclosure through said brine dehumidifier;

(c) a boiler associated with said reservoir and fired by a combustible fuel that produces carbon dioxide and water vapor for adding heat to the diluted brine, including means for concentrating said diluted brine and producing steam;

(d) means for selectively supplying said carbon dioxide and water vapor to said enclosure; and



(e) means for selectively returning to the enclosure substantially all the heat added to the brine by the boiler.

4,995,243

DROP-IN REFRIGERATION UNIT

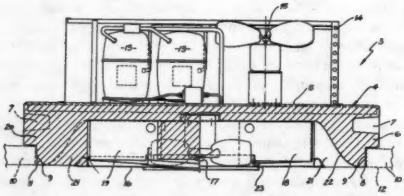
Allan Ward, San Souchi, Australia, assignor to F Muller Pty Limited, Kingsgrove, Australia

Filed Jan. 23, 1989, Ser. No. 299,760

Claims priority, application Australia, Jan. 28, 1988, PI6466

Int. Cl.[5] F25D *19/02*

U.S. Cl. 62—298 **6 Claims**



1. A drop-in package refrigeration unit for installation within an aperture in the roof of a refrigerator cabinet, said refrigeration unit comprising a heat insulating plug closing said aperture when said unit is installed, a depending peripheral skirt integral with said plug and defining a compartment at the underside of the plug, abutment means on said plug engageable with the roof of said cabinet to ensure that said skirt does not intrude substantially into said cabinet, refrigeration components mounted upon the top of the plug, a refrigeration evaporator positioned within said compartment, an air impeller within said compartment operating to create air flow over said evaporator, and air ducting defined by said skirt which includes a wall inwardly curved along its length and tapering towards a lower end of said skirt to direct said air flow from the evaporator in a path adjacent the ceiling within said cabinet.

4,995,244

REFRIGERATING MACHINE COMPRISING AN END-OF-DEFROSTING DETECTOR

Michel Steers, La Quelle En Brie; Jean-Pierre Hazan, Sucy-En-Brie, and Gilles Delmas, Epinay-Sous-Senart, all of France, assignors to U.S. Philips Corp., New York, N.Y.

Filed Dec. 5, 1989, Ser. No. 446,504

Claims priority, application France, Dec. 30, 1988, 88 17494

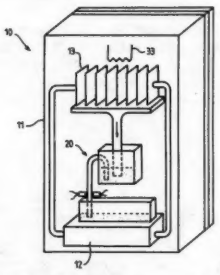
Int. Cl.[5] F25D *21/08*

U.S. Cl. 62—155 **7 Claims**

1. A refrigerating machine of the refrigerator or freezer type comprising a device for defrosting cold parts to transform the ice into water to be discharged characterized in that it comprises an end-of-defrosting detector comprising:

(1) a reservoir which receives the water to be discharged, one of the branches of a siphon extending into said reservoir in order to drain the reservoir when the water reaches the level required for activation of the siphon, the other branch being situated externally of the reservoir,

(2) a light barrier, comprising a light source and a light receiver arranged around the other branch of the siphon in such a way that a light beam of the light barrier is interrupted by the passage of water through said other branch while defrosting is in progress, and



(3) an electric circuit which processes an electric signal supplied by the light barrier to detect the end of defrosting when the light beam is not interrupted for a predetermined time,

said detector being effective to render the defrosting element inoperative when said end of defrosting is detected.

4,995,245

EVAPORATOR FOR ICE MAKER

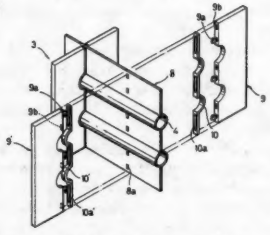
Eui Y. Chang, Seoul, Rep. of Korea, assignor to SamSung Electronics Co., Ltd., Suweon, Rep. of Korea

Filed Oct. 5, 1989, Ser. No. 416,677

Claims priority, application Rep. of Korea, Oct. 6, 1988, 88-16501

Int. Cl.[5] F25B *39/02*

U.S. Cl. 62—515 **20 Claims**



1. An evaporator for ice maker, comprising:

plate means made of a material exhibiting good heat conductivity and joined together in a unitary body, for forming therein a plurality of evaporating pipes arrayed in said unitary body between said plate means;

a plurality of separating means made of a substance exhibiting a characteristic of low heat conductivity disposable in pairs of said separating means each extending across said evaporating pipes on opposite sides of said unitary body, with each of said separating means in each said pair being interconnected through said unitary body; and

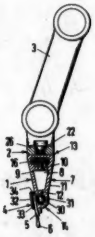
connecting means formed as integral elements of each of said separating means, for joining each said pair of the separating means with the unitary body of the plate means.

4,995,246

WARP KNITTING MACHINE WITH AT LEAST ONE BAR

Ferdinand Reich, Seligenstadt, Fed. Rep. of Germany, assignor to Karl Mayer Testilmaschinenfabrik GmbH, Fed. Rep. of Germany

Filed Nov. 27, 1989, Ser. No. 441,376
Claims priority, application Fed. Rep. of Germany, Dec. 1, 1988, 3840531
Int. Cl.[5] D04B *15/20*
U.S. Cl. 66—125 R 18 Claims



1. In a warp knitting machine having guide holders and holding arms, a guide bar assembly comprising a guide bar made of reinforced synthetic polymeric materials, said guide bar having along substantially its entire length a substantially hollow profile, said guide bar having surrounding a plurality of walls substantially enclosing said hollow profile, said guide bar comprising:

a first fastening segment adapted to be attached to said holding arms; and

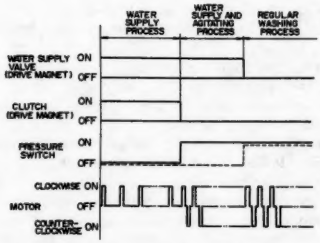
a second fastening segment adapted to support said guide holders.

4,995,247

WASHING MACHINE

Takashi Ishino; Isao Hiyama; Yousuke Nagano, all of Hitachi; Tamotu Shikamori, Ibaraki; Shizuo Turuta, Kitaibaraki; Toshiyasu Kamano, and Hiroshi Ohsugi, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 228,128, Aug. 4, 1988, abandoned, which is a division of Ser. No. 84,218, Aug. 12, 1987, abandoned.
This application Nov. 14, 1989, Ser. No. 434,470
Claims priority, application Japan, Aug. 22, 1986, 61-19540
Int. Cl.[5] D06F *33/02, 39/08*
U.S. Cl. 68—12 R 4 Claims



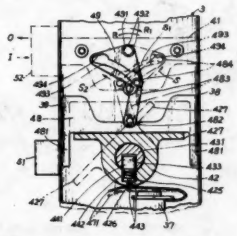
1. A washing machine comprising a washing tank, an agitating vane unit rotatably mounted in the washing tank, motor means for driving the agitating vane unit, means including water supply valves means for supplying water to the washing tank, pressure switch means for detecting a water level in the washing tank and providing output signals respectively representing a rated standard water level and a fixed water level less than the rated standard water level, control means for providing operating instructions to said motor means and said water supply valve means in response to the output signal from said pressure switch detecting means, said control means being adapted to maintain the water supply valve means in a continuously open position while instructing said motor means to operate said agitating unit to wash and agitate upon receipt of the output signal representing the fixed water level less than the rated standard water level and to close the water supply valve means upon receipt of the output signal representing the rated standard water level while instructing said motor means to continue operating the agitating vane unit.

4,995,248

CONTROL MECHANISM OF ELECTRONIC LOCK HAVING DOUBLE BOLTS

Yin-Chic Liu, P.O. Box 10160, Taipei, Taiwan

Filed Apr. 16, 1990, Ser. No. 509,905
Int. Cl.[5] E05B *47/06, 59/00*
U.S. Cl. 70—107 12 Claims



1. A control mechanism of electronic lock comprising:

an outside cover fixed on an outside surface of a door having an outside knob rotatably mounted in said outside cover and a sensor fixed on an inside surface of the outside cover operatively reading a coded number card inserted through a slot formed in said outside cover;

an inside cover corresponding to said outside cover fixed on an inside surface of the door having an inside knob rotatably mounted in said inside cover and a thumbturn pivotally formed in said inside cover;

a base secured between said outside cover and said inside cover having a battery socket for storing batteries therein for powering said sensor;

a locking bolt means having a latch bolt formed on a lower portion of the locking bolt means normally resiliently protruding outwardly and a dead bolt formed on an upper portion of the locking bolt means; and

a control means operatively retracting or extending said two bolts when actuated by the sensor reading a correct coded card for opening or closing the door, said thumbturn operatively retracting or extending said dead bolt for unlocking or locking the door,

said control means including a fixing plate secured to said base between said outside cover and inside cover, a rotating cylinder rotatably mounted in said fixing plate and said base, a rotating axle rotatably engageable in said cylinder and secured to both said outside knob and said inside knob by passing through said latch bolt for operatively retracting said latch bolt for opening the door when the dead bolt is unlocked, said rotating cylinder rotating engageabble with said axle, a tumbler set operatively coupling said cylinder with said axle, a restoring spring restoring said cylinder for a specific orientation of said cylinder, an electromagnetic coil formed under said cylinder operatively coupling said cylinder with said axle when powered by said batteries as sensed by said sensor, a counterweight rider normally overlain on said cylinder pivotally mounted with a biasing arm member thereon, and a bolt positioning member pivotally connected between said fixing plate and said base operatively biased by said arm

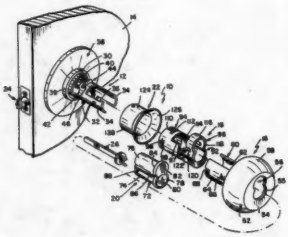
member of said counterweight rider, when rotating said outside knob, said axle, and said cylinder to bias and raise said rider, for rotating said bolt positioning member for retracting said dead bolt for opening the door.

4,995,249

DOOR HANDLE ASSEMBLY WITH HOLLOW KNOB AND INTERCHANGEABLE LOCK CORE

Christopher M. Preissler, Indianapolis, and William R. Foshee, deceased, late of Indianapolis, both of Ind. (Carolyn S. Foshee, administratix), assignors to Best Lock Corporation, Indianapolis, Ind.

Filed Oct. 23, 1989, Ser. No. 425,704
Int. Cl.[5] E05B *13/10*
U.S. Cl. 70—224 **24 Claims**



1. A door handle assembly for connection to a rotatable spindle assembly, the door handle assembly comprising

a hollow knob shell having a front face, the knob shell being formed to include an interior cavity having a front opening in the front face,

a lock core having a front end formed to include a keyway passage opening, and

a unitary core retainer sleeve situated inside the interior cavity and coupled to the knob shell, the unitary core retainer sleeve being formed to include means for supporting the lock core inside the interior cavity so that the front end of the lock core is positioned to lie in the front opening of the knob shell to permit a user to insert a key into the keyway passage opening, and wherein the unitary core retainer sleeve is mounted on the rotatable spindle assembly for rotation therewith.

4,995,250

COMBINATION LOCK FOR THE SHIFT ROD AND THE HAND-BRAKE ROD OF A CAR

Chuang C. Chiou, #34 Badding 1: Street, Taoyuan City, Taiwan

Filed Sep. 13, 1989, Ser. No. 406,684
Int. Cl.[5] E05B *65/12*
U.S. Cl. 70—238 **3 Claims**

1. A combination lock for the shift rod and the hand-brake rod of a car comprising:

a fixing head for locking the shift rod, and said fixing head being furnished with a shift rod hole and a projected portion, and said projected portion having a screw hole;

a movable sleeve having a socket at its front end and female threads in its rear end;

a lock head member, of which the center core is furnished with a shaft hole and a kerf;

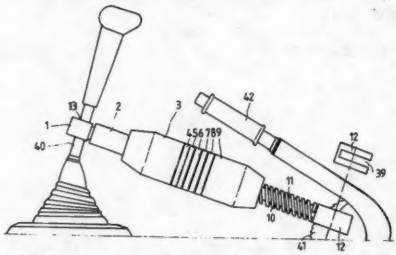
a plurality of combination rings, and each of said combination rings having a shaft hole and a kerf;

a lock tail member having a shaft hole and a kerf;

a main rod having a threaded head, a slot at one side of said rod, and main rod tail;

a spring;

an extension rod, of which the front end being connected with a toothed strip, while the rear thereof being formed into one piece with a ratchet strip jaw; and said toothed strip of said extension rod being movably mounted in the slot of said main rod, and said extension rod being movably mounted in the center of said main rod tail; and said spring being mounted between said ratchet strip jaw and said main rod tail in a retractable manner; and said main



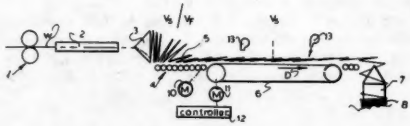
rod being mounted in place after passing through the shaft holes of said lock tail member, said combination rings, and said lock head member respectively; and said toothed strip passing through the said kerfs respectively, and then said main rod being fitted with the female threads in said movable sleeve.

4,995,251

SYSTEM FOR TRIMMING LEADING AND TRAILING ENDS FROM A WIRE COIL

Manfred Reumann, Neu-Wulmstorf; Wolfgang Preiss, Buxtehude-Eilendorf, and Andreas Kubicek, Hamelworden, all of Fed. Rep. of Germany, assignors to Hamburger Stahlwerke GmbH and Schwerdtfeger & Kubicek Systemtechnik GmbH & Co. KG, both of Hamburg, Fed. Rep. of Germany

Filed Apr. 5, 1990, Ser. No. 505,673
Claims priority, application Fed. Rep. of Germany, Apr. 26, 1989, 3913695; Jun. 17, 1989, 3919836
Int. Cl.[5] B21F *11/00*; B21B *41/10*; B26D *7/00*
U.S. Cl. 72—132 **6 Claims**



1. In a method of making wire coils comprising the steps of:

rolling a length of wire having a leading end and a trailing end and displacing the wire in a longitudinal travel direction;

coiling the wire into succeeding overlapping loops and depositing same onto an upstream conveyor;

transferring the loops from the upstream conveyor to a downstream conveyor; and

depositing the loops from the downstream conveyor onto a centering device to form a coil thereon, the improvement comprising the steps of:

driving the downstream conveyor to move the loops at a generally constant slow transport speed;

driving the upstream conveyor to move the loops at a substantially faster transport speed when loops of a portion of the wire having one of the ends are being deposited on the upstream conveyor but otherwise driving the upstream conveyor at the same slow speed as the downstream conveyor, whereby the loops of the end portion will be spaced more in the travel direction than the other loops of the wire; and

cutting through the wire at the end portion on the downstream conveyor and removing from the downstream

conveyor end-portion loops including the one end of the wire.

4,995,252

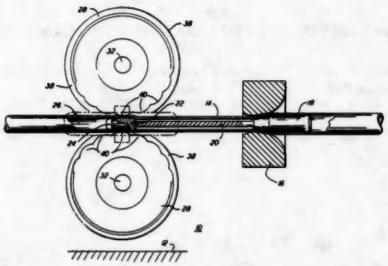
METHOD AND APPARATUS FOR INTERNALLY ENHANCING HEAT EXCHANGER TUBING

Gerald F. Robertson, Manlius; Ross A. Moyer, LaFayette, and John R. McManus, Marcellus, all of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Mar. 6, 1989, Ser. No. 319,363

Int. Cl.[5] B21C *37/20*

U.S. Cl. 72—194 20 Claims



1. A method of producing an internal enhancement on a metal tubular heat exchanger pipe which comprises the steps of moving the pipe axially over a generally cylindrical mandrel that is supported within the pipe at a substantially stationary position, the mandrel having a plurality of grooves therein that extend from one axial end to another axial end thereof; and sinking the tubular heat exchanger pipe into the grooves on the mandrel to produce internal ribs at the locations of said grooves, by rotating a plurality of pairs of opposed rotary dies to strike against the outer surface of the pipe all at one transverse plane substantially at the location of said mandrel, said dies being in the form of wheels having axes generally perpendicular to the axis of the tubular heat exchanger pipe and having circumferential portions which roll into contact with the pipe parallel to the axis of the pipe at said transverse plane, so that the dies together strike the pipe over substantially its entire circumference at said transverse plane.

4,995,253

METHOD FOR TAKING UP A BILLET PRODUCED IN THE EXTRUSION OR TUBE-MAKING PRESS AND CONTROL OF A TAKE-UP DEVICE FOR THIS PURPOSE

Horst Groos, Mettmann, and Karl-Heinz Schütte, Kaarst, both of Fed. Rep. of Germany, assignors to SMS Sutton, Inc., Pittsburgh, Pa. and SMS Hasenclever GmbH, Dusseldorf, Fed. Rep. of Germany, a part interest

PCT No. PCT/DE88/00439, § 371 Date Mar. 17, 1989, § 102(e) Date Mar. 17, 1989

PCT Filed Jul. 18, 1988, Ser. No. 327,809

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1987, 3723824

Int. Cl.[5] B21C *35/02*

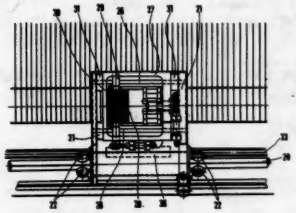
U.S. Cl. 72—257 9 Claims

1. A method for taking up a billet produced in an extrusion or tube making press with a controlled tractive force while maintaining the billet straight and without affecting the formation of the billet in a die of the press comprising:

applying a pull-away tractive force to the billet;

increasing said pull-away tractive force in proportion to the billet length, weight per unit length of the billet and coefficient of friction between the billet and a delivery table for receiving the billet;

determining the take-up tractive force dependent on the cross-section and flow characteristics in the die; and



superimposing said pull-away tractive force on said take-up tractive force for determining the desired tractive force to be exerted on the billet.

4,995,254

METHOD AND APPARATUS FOR ENSURING THE DIMENSIONAL ACCURACY OF A FRUSTO-PYRAMIDAL CAN BODY

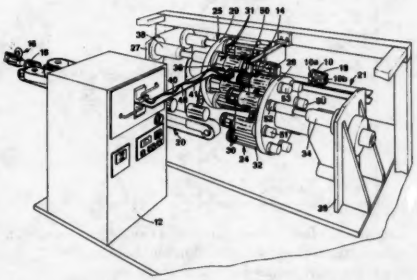
Kurt Alznauer, Lauchringen, Fed. Rep. of Germany; Michael Baumgartner, Rekingen, Switzerland; Werner Boegli, Bergdietikon, Switzerland, and Jürgen Brauer, Boniswil, Switzerland, assignors to Elpatronic AG, Zug, Switzerland

Filed Feb. 2, 1990, Ser. No. 474,470

Claims priority, application Switzerland, Feb. 16, 1989, 534/89

Int. Cl.[5] B21D *51/26*

U.S. Cl. 72—342.1 14 Claims



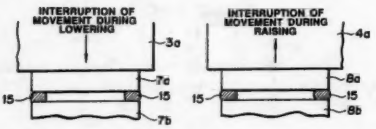
1. A method of ensuring the dimensional accuracy of a frusto-pyramidal can body produced from a rectangular sheet metal blank that is shaped cylindrically and longitudinally seam welded, comprising the steps of: shaping the seam welded can body into a tapered oval body; and then shaping the tapered oval body into a regular frustum of a pyramid which is rectangular in cross section with rounded side edges; and heating the can body after the step of shaping the tapered oval body and before the step of shaping the frustum of a pyramid.

4,995,255

METHOD OF CHANGING DIES FOR A PRESS MACHINE

Shigekazu Noda, Ishikawa, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

PCT No. PCT/JP88/01039, § 371 Date May 30, 1989, § 102(e) Date May 30, 1989, PCT Pub. No. WO89/03262, PCT Pub. Date Apr. 20, 1989
PCT Filed Oct. 12, 1988, Ser. No. 365,160
Claims priority, application Japan, Oct. 12, 1987, 62-254790
Int. Cl.[5] B21D *37/00*
U.S. Cl. 72—446 13 Claims



1. A method of changing dies in a press machine having a plurality of dies each having an upper die half respectively supported by corresponding slides and a lower die half, said slides arranged with their respective lower dead points different from each other based on a common crank angle, which comprises:

interposing elastic means between said upper die half and said lower die half of said plurality of dies, and

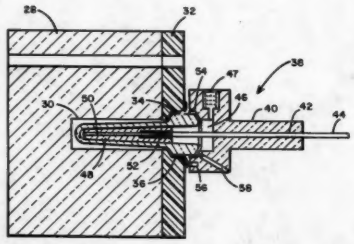
interrupting movement of said corresponding slides at a crank angle in proximity of an intermediate angle between said respective lower dead points for clamping of said upper die halves to or unclamping of said upper die halves from their corresponding slides during said interrupting of movement of said corresponding slides.

4,995,256

ZIRCONIA CELL O_2 SENSOR FOR RESPIRATORY GAS ANALYSIS

John A. Norlien, St. Paul; James M. Huhn, Arden Hills, both of Minn., and A. Gerrit Crawford, San Francisco, Calif., assignors to Medical Graphics Corporation, St. Paul, Minn.

Filed Mar. 20, 1989, Ser. No. 326,100
Int. Cl.[5] G01N *27/12*
U.S. Cl. 73—31.04 9 Claims



1. Apparatus for sensing the partial pressure of oxygen in a gaseous mixture comprising, in combination:

(a) an electrical heater having a cavity therein:

(b) a conical zirconia ceramic element having an internal bore defining a lumen with a closed distal end and an open proximal end, the wall defining said lumen being of generally uniform thickness and having a conductive coating on opposed internal and external surfaces thereof;

(c) a manifold member including a probe conforming generally to the shape of internal bore and insertable into said lumen in said element to define a narrow annular flow path between the internal wall surface of said internal bore and the exterior of said probe, said manifold member including a longitudinal bore extending completely through said probe from a proximal end to a distal end;

(d) means for coupling a gas sample to be tested to said longitudinal bore of said manifold member at said proximal end of said manifold member, sand manifold member including means for coupling a source of negative pressure in fluid communication with said annular flow path to draw said gas sample through said longitudinal bore of said manifold member and uniformly over said surface of said wall via said annular flow path; and

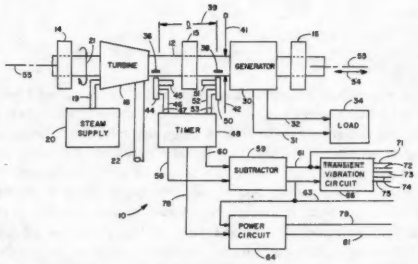
(e) means for conductively coupling said conductive coatings on the opposed surfaces of said wall to voltage measuring means.

4,995,257

MONITOR FOR SHAFT VIBRATION IN AN OPERATING TURBINE

Robert L. Leon, Roslyn, Pa., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Mar. 23, 1989, Ser. No. 327,523
Int. Cl.[5] G01M *15/00*
U.S. Cl. 73—116 19 Claims



1. An apparatus for detecting torsional events on a rotating shaft subjected to torsional loads comprising:

two marks placed on said shaft longitudinally spaced apart,

means, longitudinally spaced apart by a predetermined distance, for sensing said two marks as each mark passes a respective position as said shaft rotates,

means for measuring the lapse time for each mark to make one rotation on said shaft as the shaft rotates,

means for subtracting the lapse time of rotation of one mark from the lapse time of rotation of the other mark, whereby a difference in lapse time is indicative of torque on the shaft, and

transient vibration circuit means connected to said subtracting means for determining torsional vibrations on the shaft.

4,995,258

METHOD FOR DETERMINING AIR MASS IN A CRANKCASE SCAVENGED TWO-STROKE ENGINE

Richard M. Frank, Beverly Hills, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 26, 1990, Ser. No. 514,997
Int. Cl.[5] G01M *15/00*
U.S. Cl. 73—118.2 14 Claims

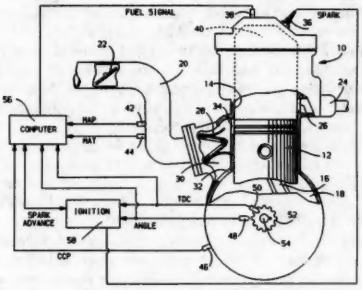
1. In a crankcase scavenged two-stroke engine characterized by an operating cycle including portions during which air is inducted into a crankcase chamber, is thereafter trapped and compressed within the shrinking volume of the crankcase chamber, and is then transferred to a combustion chamber; a method for determining the mass of air transferred to the combustion chamber during the engine cycle, comprising the steps of:

deriving indications of the pressure P, volume V, and tem-

perature T, of air within the crankcase chamber during the engine operating cycle;

determining the mass of air M_T trapped in the crankcase chamber from indicated values of pressure P, volume V, and temperature T derived during that portion of the operating cycle when air is trapped and compressed within the crankcase;

determining the residual mass of air M_R remaining in the



crankcase chamber from indicated values of pressure P, volume V, and temperature T derived during that portion of the operating cycle after the transfer of air to the combustion chamber is substantially completed; and

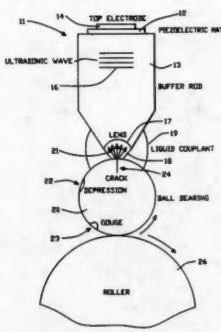
estimating the mass of air M transferred to the combustion by chamber as a function of the difference between the mass of air M_T trapped within the crankcase chamber and the mass of air M_R remaining within the crankcase chamber.

4,995,259

ACOUSTIC MICROSCOPE SURFACE INSPECTION SYSTEM AND METHOD

Butrus T. Khuri-Yakub, Palo Alto, Calif.; Philippe Parent, Chilly-Mazarin, France, and Paul A. Reinholdtsen, Seattle, Wash., assignors to The Board o ' Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Mar. 9, 1989, Ser. No. 320,950
Int. Cl.[5] G01N *29/06*
U.S. Cl. 73—593 **11 Claims**



1. An acoustic microscope surface inspection system for detecting surface defects in a test object comprising:

means for generating pulses of high frequency electrical energy;

a transducer for receiving said high frequency electrical energy pulses and generating and focusing acoustic wave pulses which impinge at a selected location on the object under test and receiving acoustic wave pulses emanating from said location and generating output signal pulses;

means for generating a reference electrical signal, at said high frequency;

means for controlling and incrementally shifting the phase between said reference signal and said high frequency electrical energy pulses at said selected location through 360 electrical degrees; and

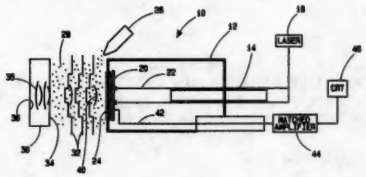
means for receiving said reference signal and said transducer output signal pulses at said selected location and provide an output signal indicative of the difference in amplitude and phase of said reference signal and transducer output signal pulses for each pulse of the pulses at said selected location.

4,995,260

NONDESTRUCTIVE MATERIAL CHARACTERIZATION

Vance A. Deason; John A. Johnson, and Kenneth L. Telschow, all of Idaho Falls, Id., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 14, 1989, Ser. No. 379,832
Int. Cl.[5] G01N *29/00*
U.S. Cl. 73—632 **20 Claims**



1. A method for nondestructive material characterization comprising:

acoustically coupling a piezoelectric (PZ) transducer to test a material;

exciting the PZ transducer using a pulsed laser such that the transducer generates an acoustic pulse which impacts the test material;

propagating an ultrasonic wave generated from said acoustic pulse through at least a portion of the test material;

reflecting said ultrasonic wave from the test material back to the transducer as a reflected acoustic pulse;

generating an electrical signal from the interaction of said reflected acoustic pulse and said PZ transducer and inputting said electric signal to an impedance matched amplifier to produce an amplified signal; and

coupling said amplifier to a read-out device to measure the amplified signal.

4,995,261

FIELD-BASED MOVEMENT SENSING APPARATUS

Stephen C. Jacobsen, and John E. Wood, both of Salt Lake City, Utah, assignors to Sarcos Group, Salt Lake City, Utah

Continuation-in-part of Ser. No. 332,593, Apr. 3, 1989. This application Oct. 20, 1989, Ser. No. 424,406
Int. Cl.[5] G01B *7/16*
U.S. Cl. 73—767 **8 Claims**

1. A transducer for measuring strain in an object on which the transducer is disposed comprising

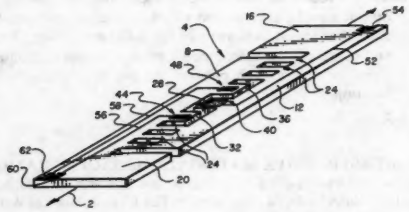
a flexible generally planar frame member for disposition on the object and including a pair of generally parallel beams one of which is moveable with respect to the other when the object is subject to strain, and a plurality of spaced-apart laterally flexible connecting beams extending between the pair of beams,

means disposed on said one moveable beam for producing a force field which emanates therefrom and which dimin-

ishes in strength with distance from the force field producing means,

spacer means disposed on the other of said beams,

substrate means disposed on said spacer means above and spaced from said frame member, and



detection means disposed on the substrate means at a location generally above the force field producing means for detecting the presence of the force field and for producing signals representing force field strength and thus the distance of the detection means from the force field producing means.

4,995,262

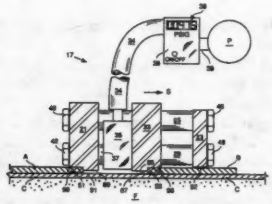
TILE SHEAR TESTING APPARATUS AND METHOD

Ray M. Reed, 7906 S. Pierce Way, Littleton, Colo. 80123

Filed Apr. 13, 1990, Ser. No. 509,019

Int. Cl.[5] G01N *3/24*

U.S. Cl. 73—842 **7 Claims**



1. An apparatus for shear testing bonding strength between a floor and tile cemented to the floor, comprising:

(a) a rigid frame including:

a reaction head being generally rectangular and having at least four holes disposed therein, said reaction head having a lateral notch therein on a rear, lower corner thereof,

an alignment end plate being generally rectangular and having at least four holes disposed therein, said alignment end plate lying in a plane generally parallel to said reaction head,

first, second, third, and fourth alignment rods each connecting said reaction head to said alignment end plate and each respectively disposed in one of said four holes in said alignment end plate and one of said four holes in said reaction head, wherein each of said alignment rods has an enlarged central portion along a length thereof and corresponding narrower portions at a front end and a rear end thereof to form a front rod shoulder and a rear rod shoulder on each rod to bear against and prevent inward movement of said alignment end plate and said reaction head respectively, and

threaded securement members on said front end and said rear end of each of said first, second, third and fourth rods to rigidly secure said rods to said reaction head and to said alignment end plate;

(b) a centrally located movable head being generally rectangular and having at least four holes disposed therein, said movable head lying in a plane generally parallel to and inbetween said reaction head and said alignment end plate, wherein said four holes in said movable head each have a hardened steel liner disposed therein and disposed around a respective enlarged central portion of a respective one of said first, second, third and fourth alignment rods, wherein said movable head is slidable along said rods between said reaction head and said alignment end plate in a slide direction generally parallel to the floor with said movable head and said reaction head each in a planar orientation generally perpendicular to the floor, wherein said movable head has a laterally curved notch therein on a front, lower corner thereof;

(c) a fluid-pressure activated expansion unit positioned between said reaction head and said centrally located movable head to force said reaction head and said centrally located movable head to force said reaction head and said movable head away from one another responsive to increased fluid pressure in said expansion unit, wherein said expansion unit includes a pressure readout having increments with precision of at least ten pounds per square inch;

(d) a first hardened steel jaw attached in said notch of said reaction head, said first jaw bearing against a first tile cemented to the floor; and

(e) a second hardened steel jaw attached in said curved notch of said movable head, wherein said second jaw is laterally curved on one face to correspond to said curved notch and is slidable in said curved notch, and wherein said second jaw is generally flat along an opposite face to said curved face to bear against a second tile cemented to the floor, wherein sliding along said curved notch creates a swivel action in said second jaw to engage said second tile flush.

4,995,263

TUNING FORK QUARTZ MANOMETER

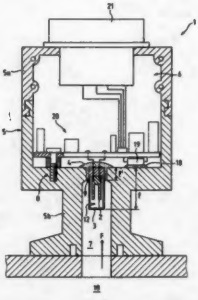
Rudolf Stocker, Azmoos, Switzerland, assignor to Balzers Aktiengesellschaft, Balzers, Liechtenstein

Filed Dec. 14, 1989, Ser. No. 450,857

Claims priority, application Switzerland, Jan. 23, 1989, 00204/89

Int. Cl.[5] G01L *11/00*

U.S. Cl. 73—702 **17 Claims**



1. Turning fork manometer having

a measuring head (1) including

a tuning fork quartz (2);

a self-oscillating feedback circuit (23) having circuit components (19, 20), said tuning fork quartz (2) being connected in said circuit; and

a protective casing (3) surrounding the turning fork quartz,

wherein the measuring head comprises

a mounting support for retaining said tuning fork quartz (2) and said protective casing (3) in position and, further, for mounting said circuit components; and

wherein said tuning fork quartz and said circuit components are secured to said mounting support and thermally coupled together in heat transferring relation, and said circuit components and said tuning fork quartz are physically located close to each other to minimize connecting line lengths and enhance said thermal coupling.

4,995,264

GAS PRESSURE GAUGE AND PRESSURE MEASURING METHOD

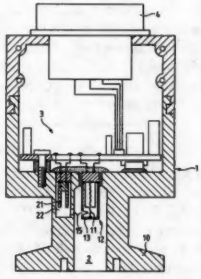
Rudolf Stocker, Azmoos, and Walter Schaedler, Triesen, both of Switzerland, assignors to Balzers Aktiengesellschaft, Balzers, Liechtenstein

Filed Dec. 14, 1989, Ser. No. 450,856

Claims priority, application Switzerland, Jan. 23, 1989, 00206/89

Int. Cl.[5] G01L *11/00, 21/12*

U.S. Cl. 73—702 **20 Claims**



11. A compensated gas pressure measuring gauge, providing a combined pressure output signal which is essentially independent of the molecular mass (M) of the gas, the pressure of which is to be determined,

and especially for measuring low pressure values in the vacuum pressure level range, comprising

a heat conduction gauge (12, 12, 13) exposed (15) to the gas, the pressure of which is to be measured, and furnishing a first signal which is inversely proportional to $M^{\frac{1}{2}}$;

a gas friction gauge (21) exposed (15) to said gas, the pressure of which is to be measured, and furnishing a second signal which is directly proportional to $M^{\frac{1}{2}}$;

and a combining circuit (3; W·G, W+G) coupled to receive said first measuring signal (W) and said second measuring signal (G) and combining said first and second measuring signals in such a manner that the inverse dependency of said first measuring signal on gas molecular mass, and the direct dependency of said second measuring signal on gas molecular mass effectively cancel each other to form a common output signal, which is essentially independent of the type of the gas, the pressure of which is to be measured, and hence of its molecular mass.

4,995,265

DEGRADATION AND CONTAMINATION COMPENSATED TUNING FORK QUARTZ MONOMETER, AND METHOD TO COMPENSATE FOR TUNING QUARTZ DEGRADATION AND CONTAMINATION

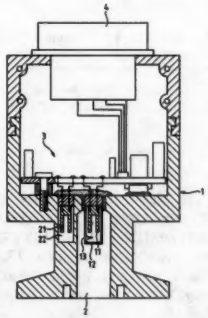
Rudolf Stocker, Azmoos, Switzerland, assignor to Balzers Aktiengesellschaft, Balzers, Liechtenstein

Filed Dec. 14, 1989, Ser. No. 452,112

Claims priority, application Switzerland, Jan. 23, 1989, 00205/89

Int. Cl.[5] G01L *11/00*

U.S. Cl. 73—702 **16 Claims**



1. Process for measuring pressure with a tuning fork quartz operated at resonant frequency, in which the pressure (p) of a measuring volume is determined by measuring a damping value corresponding to the oscillation damping of the quartz, characterized in that the damping value is combined with a correction value proportional to the resonant frequency (f_R).

4,995,266

DIFFERENTIAL PRESSURE TRANSMITTER

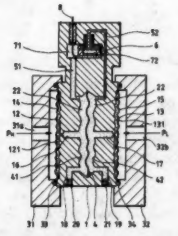
Tomoyuki Tobita, Katsuta, and Yoshimi Yamamoto, Naka, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 29, 1989, Ser. No. 399,916

Claims priority, application Japan, Sep. 2, 1988, 63-218361

Int. Cl.[5] G01L *7/08, 9/06, 13/06*

U.S. Cl. 73—706 **7 Claims**



1. A differential pressure transmitter, comprising:

a body;

pressure-receiving diaphragms disposed on both sides of the body, and the periphery of the diaphragms being fixed to the body forming recesses filed with a pressure transmission medium;

a diaphragm disposed between the pressure-receiving diaphragms forming chambers filed with the pressure transmission medium into the body;

two first communication passages for communicating the chambers with the respective recesses;

two second communication passages for transmitting the pressure of the chambers; and

a differential pressure sensor with pressure-measuring chambers for receiving the pressures transmitted by the two second communication passages, and converting a differential pressure of the pressures transmitted from the two second communication passages into an electrical signal, wherein the diameter D of the first communication passage is

$$\sqrt{\frac{\left(\begin{array}{c}\text{viscosity of the medium}\\ \hline \text{volume elasticity modulus of the medium}\end{array}\right)\times\left(\begin{array}{c}\text{kinematic coefficient of}\\ \text{viscosity of the medium}\end{array}\right)\times\left(\begin{array}{c}\text{length of each second}\\ \text{communication passage}\end{array}\right)\times\left(\begin{array}{c}\text{volume of each pressure}\\ \text{measuring chamber}\end{array}\right)}{\left(\begin{array}{c}\text{diameter of each second}\\ \text{communication passage to recess}\end{array}\right)^{2}}}$$

4,995,267

METHOD OF MONITORING THE STATE OF ELONGATED OBJECT AND APPARATUS FOR PERFORMING THIS METHOD

Sergei M. Mikheev, ulitsa Zelenodolskaya, 17, korpus 5, kv. 72; Valery N. Zemerov, prospekt Vernadskogo, 67, kv. 16, and Petr V. Elshansky, Volzhsky bulvar, 6, korpus 1, kv. 17, all of Moscow, U.S.S.R.

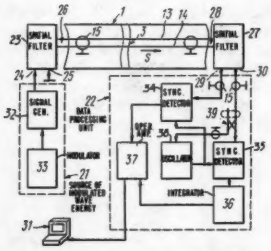
PCT No. PCT/SU88/00082, § 371 Date Jan. 5, 1989, § 102(e) Date Jan. 5, 1989, PCT Pub. No. WO88/08331, PCT Pub. Date Nov. 3, 1988

PCT Filed Apr. 14, 1988, Ser. No. 299,832

Claims priority, application U.S.S.R., May 5, 1987, 4232328

Int. Cl.[5] G01L *1/24*

U.S. Cl. 73—800 **8 Claims**



1. A method of monitoring the state of an elongated object, comprising the steps of selecting an element responsive to variation of a parameter being monitored representative of the state of an elongated object **(1)**, selecting an extended line **(3)** of transmission of wave energy capable of carrying the information on variation of the monitored parameter representative of the state of the elongated object **(1)**, integrating said selected responsive element in said extended line **(3)** of transmission of wave energy, locating said integrated responsive element and extended line **(3)** of transmission of wave energy in the zone of monitoring on a predetermined coordinate (S), along which the monitored parameter representative of the state of the elongated object **(1)** tends to vary, shaping and feeding, to the input of the extended line **(3)** of transmission of wave energy, a time-modulated reference signal transformable in the course of propagation along said line **(3)** in accordance with variation of the monitored parameter representative of the state of the elongated object **(1)**, measuring the parameters of the converted reference signal at the output of the extended line **(3)** of transmission of wave energy, and determining the physical and mechanical characteristics of the state of the elongated object **(1)** on the predetermined coordinate (S), along which the monitored parameter tends to vary, in accordance with the measured parameters of the converted reference signal, which comprises the additional steps of selecting the extended line **(3)** of transmission of wave energy, providing for propagation of signals therein in the form of modes with known-space- and time-dependent patterns of physical fields, providing in the extended line **(3)** of transmission of wave energy at least one reference channel **(13)** and at least one measurement channel **(14)** with known decelerations of the phase velocities of the modes in each said channel, providing for directional interaction along the extended line **(3)** of transmission of wave energy in the fields of the modes in at least one reference channel **(13)** and in at least one measurement channel **(14)**, depending on variation of the monitored parameter, for obtaining in the measurement channel **(14)** a signal varying in the course of propagation of the signal in the reference channel **(13)** in accordance with variation of the monitored parameter representative of the state of the elongated object **(1)**, shaping said time-modulated reference signal in the form of time-modulated oscillation of physical fields and converting this oscillation into a signal with a predetermined spatial pattern of the fields of the modes, converting the fields of the modes at the outputs of at least one reference channel and at least one measurement channel **(14)** of the extended line **(3)** of transmission of wave energy into exclusively time-dependent electric signals for determining the physical and mechanical characteristics of the state of the elongated object **(1)** on the predetermined coordinate (S), along which the monitored parameter tends to vary, extracting the amplitude of the electric signal at the output of the reference channel **(13)**, amplifying the electric signal at the output of the measuring channel **(14)** in inverse proportion to the value of the amplitude of the electric signal at the output of the reference channel **(13)**, and employing linear scale transformation relating the value of the differential of decelerations of the phase velocities of the modes in the reference channel **(13)** and in the measurement channel **(14)** of the extended line **(3)** of transmission of wave energy to the current time of monitoring and the count of the dimension of the coordinate (S) along the extended line **(3)** of transmission of wave energy.

4,995,268

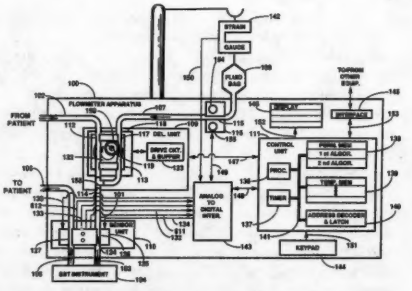
METHOD AND APPARATUS FOR DETERMINING A RATE OF FLOW OF BLOOD FOR AN EXTRACORPOREAL BLOOD THERAPY INSTRUMENT

Stephen R. Ash, Lafayette, and Terrance G. Echard, West Lafayette, both of Ind., assignors to Ash Medical System, Incorporated, West Lafayette, Ind.

Filed Sep. 1, 1989, Ser. No. 402,073

Int. Cl.[5] G01F *1/704*

U.S. Cl. 73—861.05 **30 Claims**



1. For use with an extracorporeal blood therapy instrument, apparatus for determining a rate of flow of blood through a channel, comprising:

delivery means for producing a trailing interface of another fluid and between said blood and said another fluid at a first predetermined position in said channel;

sensor means for producing an output signal indicative of when said trailing interface is at a second predetermined position in said channel, said channel having a predetermined volume between said first and second predetermined positions; and

control means utilizing a predetermined algorithm and an indication of said volume and responsive to said output signal and an indication of when said trailing interface is produced for calculating said blood flow rate through said channel.

4,995,269

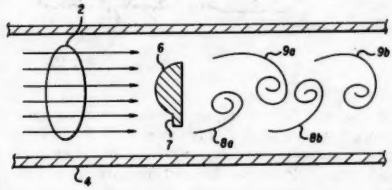
VORTEX FLOWMETER HAVING AN ASYMMETRIC CENTER BODY

George Mon, Potomac, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 8, 1990, Ser. No. 491,805

Int. Cl.[5] G01F *1/32*

U.S. Cl. 73—861.22 **8 Claims**



1. A Karman vortex street generating device comprising:

a flow tube;

an asymmetrical blunt body rigidly mounted on at least one end in a stream of flowing fluid contained within said flow tube so as to form vortices downstream of said asymmetrical blunt body, said asymmetrical blunt body comprising the shape of a hemisphere with a tab at one side.

4,995,270

MOLTEN METAL SAMPLING

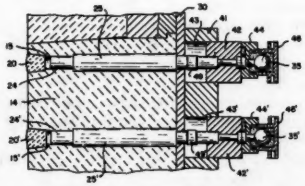
Anthony Thrower, Nr. Sheffield, and Kenneth W. Bates, Chesterfield, both of England, assignors to Injectall Limited, Sheffield, England

Continuation of Ser. No. 285,497, Dec. 29, 1988, abandoned. This application Apr. 10, 1990, Ser. No. 507,667

Claims priority, application United Kingdom, May 1, 1987, 8710378

Int. Cl.[5] G01N *1/00*

U.S. Cl. 73—863.85 **35 Claims**



25. A sample for use in taking a sampler of metal from a vessel containing molten metal comprising a dispensible unit including a rigid, elongated pipe for extending into said vessel through the wall of said vessel and a sample mould for remaining outside the wall of said vessel operatively associated with an end of said pipe, the mould being detached from the pipe while the pipe remains in said wall after a metal sample has been collected in the sampler.

4,995,271

APPARTAUS FOR DETERMINING THE PERMEABILITY OF A WEB TO AIR

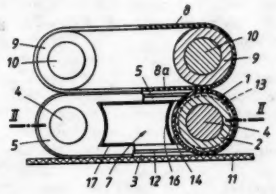
Ludwig Kis, Puchenau, Austria, assignor to Textilmaschenenfabrik Dr. Ernst Fehrer Aktiengesellschaft, Leonding, Austria

Filed Feb. 9, 1990, Ser. No. 478,231

Claims priority, application Austria, Feb. 27, 1989, 428/89

Int. Cl.[5] G01N *15/08*

U.S. Cl. 73—38 **7 Claims**



1. In an apparatus for determining the permeability of a web to air, comprising

a testing head, which is adapted to be applied to a web in airtight contact therewith and is operable to pass a stream of measuring air through said web, and

a connecting line connected to said testing head and adapted to be connected to a measuring device for measuring said measuring air stream,

the improvement residing in that

said testing head comprises two laterally spaced apart end walls,

two laterally spaced apart, parallel contact rollers extend between and are rotatably mounted in said end walls,

each of said contact rollers is provided on its periphery with a rubber-elastic sheath and has to mutually opposite end portions axially protruding from said sheath,

two endless sealing belts are provided, each of which has two wrapping portions, which are trained around corresponding ones of said end portions of said contact rollers and closely adjoin said sheaths, whereby said wrapping portions and said sheath constitute a gapless peripheral surface portion on each of said contact rollers,

each of said sealing belts has an axially outer edge portion, which axially protrudes from said contact rollers and constitutes a sealing lip in sealing contact with the adjacent one of said end walls,

said contacting rollers and said sealing belts define between them an air-guiding space and have a contacting side adapted to contact said web and an outer side opposite to said contacting side,

two laterally spaced apart reversing pulleys, which are parallel to said contact rollers, are disposed on said outer side of said contact rollers,

an endless covering belt is trained around said reversing pulleys and in sealing contact with said contact rollers and said sealing belts on said outer side thereof to seal said air-guiding space on said outer side, and

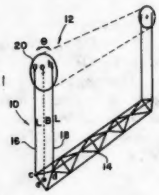
said connecting line extends from one of said end walls and communicates with said air-guiding space.

4,995,272

TORSIONAL SUSPENSION SYSTEM FOR TESTING SPACE STRUCTURES

Wilmer H. Reed, III, Hampton, and Ronald R. Gold, Newport News, both of Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 26, 1989, Ser. No. 357,757
Int. Cl.[5] G01M *7/02, 19/00*
U.S. Cl. 73—865.6 8 Claims



1. A low frequency torsional suspension system for testing a space structure having a length and a center of gravity, the system comprising:

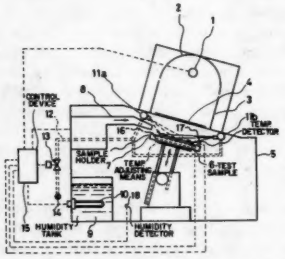
a plurality of suspension stations attached to the space structure along the length thereof for suspending the space structure from an overhead support, each suspension station including a disk pivotally mounted to the overhead support and having a horizontal pivot axis, two cables each having upper and lower end and the same length, the lower ends of the two cables being connectable to the space structure and the upper ends being connectable to the disk so that the points of attachment for the upper and lower ends define a parallelogram with the center of gravity of the space structure being vertically beneath the pivot axis of the disk.

4,995,273

METHOD OF AN APPARATUS FOR WEATHER RESISTANCE TEST

Yoshio Kisima, Tokyo; Teruo Iwanaga, and Hitoshi Goto, both of Gyoda, all of Japan, assignors to Dainippon Plastics Co., Ltd., Tokyo, Japan

Filed May 18, 1989, Ser. No. 353,727
Claims priority, application Japan, May 31, 1988, 63-131627
Int. Cl.[5] G01N *17/00*
U.S. Cl. 73—865.6 18 Claims



1. An apparatus for performing weather resistance test on a sample surface comprising:

means for holding a sample having a surface to be tested;

means including a source of ultraviolet light for applying ultraviolet rays to said sample surface;

means including a source of moisture of condensing moisture on the surface of said sample;

means for washing said surface of said sample with a cleaner; and

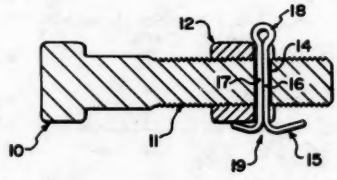
means for controlling a repetitive cycle of operation of each of said means such that said ultraviolet light source is turned on for a first period of time after which the application of ultraviolet rays is terminated, whereafter said condensing means is operated for a second period of time after which the condensing is concluded, and said washing means is operated at least for a time between the time said condensing operation is concluded and said ultraviolet light source is turned on.

4,995,274

LOCKING PIN AND NUT COMBINATION AND METHOD FOR VISUAL INSPECTION THEREOF

Henry Kleeman, Box 191, Oakville, Manitoba, Canada R0H 0Y0

Filed Nov. 20, 1989, Ser. No. 438,041
Int. Cl.[5] G01N *21/29;* G01M *11/00;* F16B *39/04, 41/00*
U.S. Cl. 73—865.8 8 Claims



1. A method of inspecting an assembly including a plurality of elements, and a plurality of fasteners, each for fastening one of the elements to a respective other one of the elements and comprising a male screw threaded member, a nut having a female screw thread cooperating with the member so as to be fastened on the member and a locking pin engaging the member and a nut to prevent an intended rotation of the nut, the method comprising forming the pins with an outer surface which has a visibly distinctive color difference from that of the associated nut and visually inspecting the assembly to locate those nuts from which the associated pin is inadvertently missing.

4,995,275

DEVICE FOR SUPPORTING PINION SHAFT OF ELECTRIC MOTOR FOR STARTING ENGINE

Kyoichi Okamoto, and Kazuo Takami, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 171,951, Mar. 23, 1988, Pat. No. 4,895,035. This application Oct. 16, 1989, Ser. No. 422,018
Claims priority, application Japan, Mar. 26, 1987, 62-45224
The portion of the term of this patent subsequent to Jan. 23, 2007, has been disclaimed.
Int. Cl.[5] F02N *15/06;* F16J *15/32;* F16C *21/00*
U.S. Cl. 74—7 A 11 Claims

1. An overhang-type starter comprising:

a housing having an interior and an exterior with an opening passing from said interior to said exterior;

a shaft with an axis;

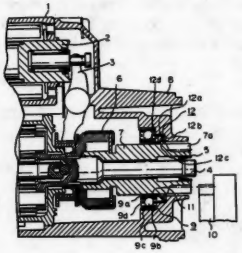
a tubular clutch pinion shaft with an axis coincident with said shaft axis, slidable over said shaft and being driven by said shaft;

means for sliding said pinion shaft over said shaft through said housing opening;

a ball bearing having an annular outer race mounted in said housing opening, an annular inner race through which said pinion shaft and said shaft slide and bearing balls located between said outer race and said inner race;

an oil seal disposed adjacent to said bearing on the side of said ball bearing facing said exterior of said housing, said

oil seal and said ball bearing forming a cavity for holding lubricant, said oil seal having an outer periphery mounted



in said housing and two annular lips which contact said pinion shaft.

4,995,276

TRACKED VEHICLE DRIVE SYSTEM

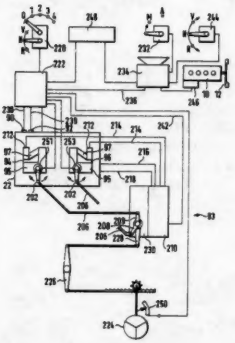
Franz X. Zaunberger, Augsburg, Fed. Rep. of Germany, assignor to Renk Aktiengesellschaft, Augsburg, Fed. Rep. of Germany

Continuation of Ser. No. 251,337, Sep. 30, 1988, abandoned, which is a division of Ser. No. 113,748, Oct. 26, 1987, Pat. No. 4,890,508. This application Feb. 14, 1990, Ser. No. 480,366

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1986, 3636211; Oct. 24, 1986, 3636267; Oct. 24, 1986, 3636153

Int. Cl.[5] G16H *27/02*; G05G *11/00, 13/00*

U.S. Cl. 74—89.15 **19 Claims**



9. A control element position setting apparatus comprising a first input element, means mounting the first input element for rotation about an axis in response to a first input, a second input element, means mounting the second input element for translational movement in response to a second input, a position setting output element for adjusting the control element, means mounting the output element for rotation about a fixed axis coincident with the axis of the first input element, means for interconnecting the first and the second input elements with the output element, the means for interconnecting including means rotating the output element as a function of the position of both the first input element and the second input element.

4,995,277

TWO DIMENSIONAL DRIVE SYSTEM

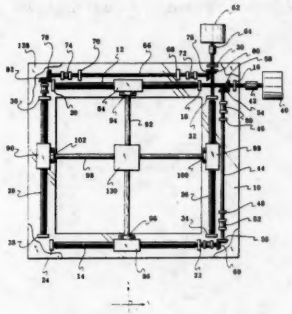
Ken Yanagisawa, c/o, Kabushiki Kaisha Mechanic Sekkei Jimusho, 5175-1, Ooaza Toyoshina, Toyoshina-machi, Minamiazumi-gun, Nagano-ken, Japan

Filed May 11, 1989, Ser. No. 350,238

Claims priority, application Japan, May 31, 1988, 63-134209; May 31, 1988, 63-134210

Int. Cl.[5] F16H *19/02*

U.S. Cl. 74—89.15 **18 Claims**



1. A two dimensional drive system comprising:

a pair of first guide means provided in parallel;

a pair of second guide means provided in parallel and perpendicular to said first guide means;

a pair of first travellers movably provided on said first guide means, said first travellers being movable in a first direction along said first guide means;

a pair of second travellers movably provided on said second guide means, said second travellers being movable in a second direction perpendicular to the first direction along said second guide means;

at least one first rod having both ends, respectively, connected to said first travellers provided in parallel to said second guide means;

at least one second rod having both ends, respectively, connected to said second travellers provided in parallel to said first guide means;

a slider movably provided on said at least one first rod and said at least one second rod, said slider being of a predetermined shape with a central opening therethrough, said central opening having a perimeter being spaced a predetermined distance from at least two edge surfaces of said slider with portions of said slider being disposed between said perimeter of said central opening and said at least two edge surfaces, said at least one first rod and said at least one second rod pass through said portions of said slider disposed between said perimeter of said central opening and said at least two edge surfaces;

first drive means for synchronously moving said first travellers in the first direction; and

second drive means for synchronously moving said second travellers in the second direction.

4,995,278

CAR MARK EMBLEM DISPLAY AND STORAGE DEVICE

Yung C. Huang, 4 Fl., No. 136, Sec. 3, Yeng Ping N. Rd., Taipei, Taiwan

Filed Jul. 27, 1989, Ser. No. 386,454

Int. Cl.[5] F16H *27/02*; G03F *7/00*

U.S. Cl. 74—89.15 **20 Claims**

1. A car mark emblem display and storage device for displaying a car mark emblem to protrude from a car engine hood

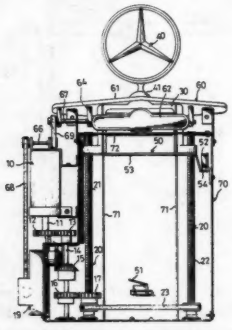
or storing the car mark emblem in the car engine hood, comprising:

a motor;

a guide screw unit actuated by said motor, including two elongated parallel spaced vertically extending guide screws, a distance defined between said two elongated guide screws being such that said mark emblem retained therewithin is readily movable in a vertical direction;

a seat for supporting said mark emblem, said seat being slidable vertically along said two elongated guide screws and including a partially circular rack for fixing a spherical stand of said mark emblem;

a limit control unit including a lower limit switch, an upper



limit switch, and a bottom panel having a side wing, said bottom panel being slidable vertically along said two elongated guide screws; a lower face of said bottom panel being contactable with said lower limit switch when said mark emblem has been fully lowered, said side wing being contactable with said upper limit switch when said mark emblem has been fully raised;

a top cover unit for mounting on said car engine hood, said top cover unit including a top cover with a first opening for the passage of said mark emblem and a movable cover for movably covering said opening, said movable cover being actuated by said motor;

a body frame for retaining said motor, said guide screw unit, said seat and combined with said top cover unit.

4,995,279

TRANSMISSION SYSTEMS

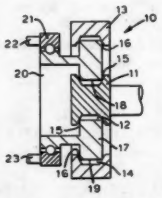
Bryan N. V. Parsons, Stoney Stanton, United Kingdom, assignor to Jaguar Cars Limited, United Kingdom

Division of Ser. No. 230,787, Aug. 10, 1988. This application Mar. 15, 1990, Ser. No. 493,988

Claims priority, application United Kingdom, Aug. 25, 1987, 8720051; Aug. 25, 1987, 8720053

Int. Cl.[5] F16H *15/08*

U.S. Cl. 74—199 **13 Claims**



1. A transmission system comprising; a disc drivingly connected to a first shaft, said disc having a frustoconical groove in its outer periphery, the walls of the groove being inclined inwardly towards one another; an annular element mounted for rotation about the disc, so that the inner periphery of the annular element is located within the groove, opposite faces of the annular element engaging the opposed walls of the groove; means for moving the annular element eccentrically relative to the disc; and an Oldham coupling for transmitting rotary motion of the annular element to a second shaft.

4,995,280

BICYCLE SPEED CHANGE LEVER ASSEMBLY

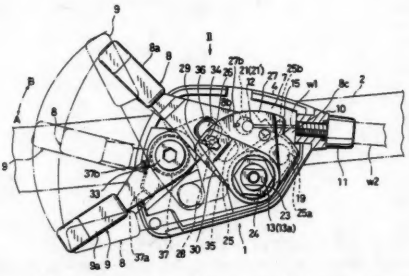
Koichi Tagawa, Kawachinagano, Japan, assignor to Maeda Industries, Ltd., Osaka, Japan

Filed Apr. 25, 1990, Ser. No. 514,279

Claims priority, application Japan, Jun. 26, 1989, 1-165005

Int. Cl.[5] B62M *25/04*; G05G *11/00*

U.S. Cl. 74—480 R **13 Claims**



1. A bicycle speed change lever assembly comprising:

a first lever pivotally supported by a first pivot shaft, said first lever being connected to one end of a control cable;

a second lever pivotally supported by a second pivot shaft which is displaced from said first pivot shaft but extends in parallel thereto; and

a reversal connecting mechanism for connecting said first lever to said second lever in such a way that when one of said levers is progressively pivoted in one direction, the other lever is progressively pivoted in the opposite direction.

4,995,281

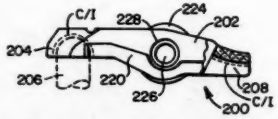
LIGHTWEIGHT ROCKER ARM

Richard L. Allor, Livonia; John A. Herman, Sr., Trenton, and George C. DeBell, Plymouth, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jul. 31, 1989, Ser. No. 386,755

Int. Cl.[5] G05G *1/10*

U.S. Cl. 74—559 **13 Claims**



1. A lightweight rocker arm assembly of the cam follower type for an internal combustion engine comprising:

an elongated rocker arm body formed of a metal matrix composite material, said rocker arm body having a generally rectangular centralized opening extending between sidewalls thereof, a first end formed to engage a support upon which said rocker arm pivots and a second end for engaging and activating a valve stem; and

cam engaging means comprising a roller formed of a first ceramic material for engaging a cam on a rotating cam shaft to pivot said rocker arm assembly, said roller being

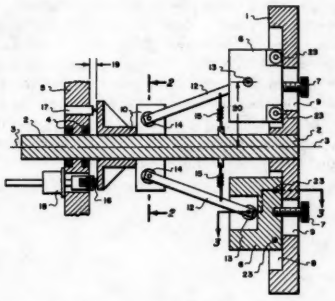
mounted for rotation on a roller shaft formed of a second ceramic material and mounted in circular openings in the sidewalls of said rocker arm body intermediate said rocker arm body first and second ends.

4,995,282

CONTROLLABLE INERTIA FLYWHEEL

Larry L. Schumacher, 18876 Tenderfoot Trail, Newhall, Calif. 91321

Filed Jul. 19, 1989, Ser. No. 381,800
Int. Cl.[5] F03G *3/08*
U.S. Cl. 74—572 **3 Claims**



1. A flywheel apparatus comprising:
a. a drive shaft supporting said flywheel apparatus cantilevered from a single bearing;
b. a constant inertia flywheel fixedly attached to said drive shaft;
c. at least two control masses slidingly attached to said constant inertia flywheel by slots and threaded means and translatable orthogonal to a drive shaft rotational axis;
d. a shaft collar constrained to rotate with sad drive shaft and forced by an inertia control actuator to slid on said drive shaft's surface parallel to said drive shaft rotational axis;
e. linkage structures attaching said shaft collar to each control mass through bearings that minimize lost linear or angular motion;
f. springs attaching said linkage structures to said drive shaft;
g. a control actuator positioning said shaft collar and said control masses to achieve a desired flywheel inertia.

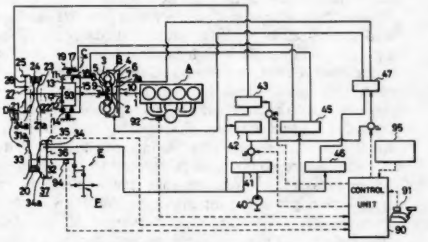
4,995,283

HYDRAULIC CONTROL SYSTEM FOR STEPLESSLY VARIABLE POWER TRANSMISSION

Tomoo Sawasaki, and Chitoshi Morishige, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed May 19, 1989, Ser. No. 354,519
Claims priority, application Japan, May 19, 1988, 63-123273
Int. Cl.[5] B60K *41/18*
U.S. Cl. 74—866 **26 Claims**

1. A hydraulic control system for a steplessly variable power transmission comprising:
primary and secondary pulleys, each provided with a stationary conical plate mounted on a shaft and a movable conical plate mounted so as to be axially movable on the shaft,
a belt connected with both of the primary and secondary pulleys for transmitting engine power from said primary pulley to said secondary pulley,
said primary and secondary pulleys each including a hydraulic chamber into which a hydraulic pressure is introduced for controlling axial movement of the movable conical plates so that effective diameters of the primary and secondary pulleys are changed for controlling a speed ratio transmitted through the transmission,
a speed ratio control valve for controlling the hydraulic pressure introduced into the hydraulic chamber in accordance with a pilot pressure introduced into a pilot chamber provided in the speed ratio control valve,
a solenoid valve for controlling the pilot pressure for the speed ratio control valve,



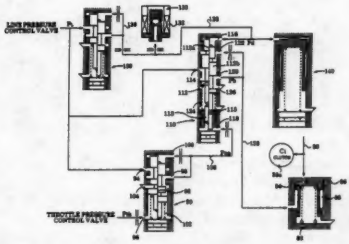
fluid pressure producing means for producing a control pressure in accordance with a vehicle driving condition,
switching means for selectively connecting the pilot chamber with either the solenoid valve or the fluid pressure producing means, the switching means being actuated to connect the pilot chamber with the fluid pressure producing means when a deviation between an actual pilot pressure and a desirable pilot pressure is increased beyond a predetermined value.

4,995,284

ACCUMULATOR CONTROL DEVICE FOR HYDRAULIC CONTROL DEVICE FOR AUTOMATIC TRANSMISSION FOR VEHICLE WITH ENGINE LOAD DEPENDENT BACKUP CONTROL

Mitsuru Takada; Hiroshi Itoh, both of Toyota; Tokuyuki Takahashi, Aichi, and Makoto Funahashi, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Aug. 2, 1989, Ser. No. 388,515
Claims priority, application Japan, Aug. 2, 1988, 63-192965; Nov. 11, 1988, 63-285137; Nov. 21, 1988, 63-294409
Int. Cl.[5] F16H *61/12*
U.S. Cl. 74—868 **4 Claims**



1. A hydraulic control device for an accumulator in a speed stage shifting device of an automatic transmission for a vehicle such as an automobile, comprising:
an electromagnetic valve means for generating a first hydraulic pressure having a pressure level characteristic for primarily determining a second hydraulic pressure to be supplied to a back pressure chamber of said accumulator according to an electric signal supplied thereto, said electromagnetic valve means decreasing the pressure level of

said first hydraulic pressure substantially to zero when it fails to operate; and

an accumulator control valve means for generating said second hydraulic pressure to be supplied to the back pressure chamber of said accumulator by modulating a source of hydraulic pressure therefor according to a balance between said second hydraulic pressure itself and a third hydraulic pressure available in said automatic transmission as having a pressure level characteristic increasing or decreasing along with an increase or decrease of engine output power, under an influence of said first hydraulic pressure, so that said second hydraulic pressure increases or decreases along with an increase or decrease of said third hydraulic pressure under said influence of said first hydraulic pressure, wherein said accumulator control valve has a spool element having a first pressure receiving area exposed to said second hydraulic pressure to provide a positive feed back effect of decreasing said second hydraulic pressure along with an increase thereof and a second pressure receiving area exposed to said third hydraulic pressure, said first pressure receiving area having an effective pressure responsive sectional area which generates a first force under said second hydraulic pressure, said second pressure receiving area having an effective pressure responsive sectional area which generates a second force substantially equal in the magnitude thereof and opposite in the orientation thereof to said first force under said third hydraulic pressure.

4,995,285

FAIL-SAFE HYDRAULIC CONTROL VALVES IN AN AUTOMATIC TRANSMISSION

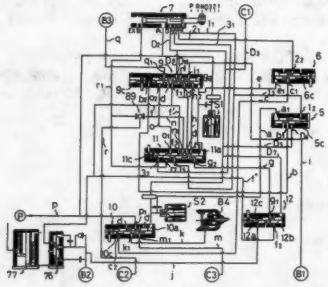
Youichi Hayakawa, Toyoake; Yoshinari Kuwayama, Tokoname, and Yoshihiro Yamada, Anjo, all of Japan, assignors to Aisin AW Co., Ltd., Anjo, Japan

Filed Jan. 4, 1989, Ser. No. 293,253

Claims priority, application Japan, Oct. 6, 1988, 63-252737

Int. Cl.[5] F16H *59/00, 61/00, 45/00*

U.S. Cl. 74—869 **3 Claims**



1. A hydraulic control device for an automatic transmission, comprising:

a shift gear mechanism having rotational elements and frictional engaging elements;

a plurality of hydraulic servos for connecting the frictional engaging elements, to rotational elements;

first, second and third shift valves to control hydraulic pressure working on the hydraulic servos, said first and second shift valves having control chambers, respectively;

a first solenoid valve for controlling said first and third shift valves;

a second solenoid valve for controlling said second shift valve;

a manual valve having a D range port, a 1 range port, a 2 range port and a 3 range port;

a first emergency control valve having a first port connected to the D range port of the manual valve; a second port connected to the control chamber of the first shift valve, hydraulic pressure applied to the control chamber of the first shift valve operating against control pressure applied through the first solenoid valve; a first control chamber connected to the second solenoid valve so that the first and second ports are connected together by applying control pressure to the first control chamber; and a second control chamber connected to the 1 range port of the manual valve so that the first port and second port are disconnected by applying control pressure to the second control chamber when the first and second solenoid valves are off, and

a second emergency control valve having a first port connected to the 2 range port of the manual valve; a second port connected to the control chamber of the second shift valve, hydraulic pressure applied to the control chamber of the second shift valve operating against control pressure applied through the second solenoid valve; and a control chamber connected to the first solenoid valve so that the first port and second port are connected together by applying control pressure to the control chamber of the second emergency control valve.

4,995,286

APPARATUS FOR REMOVING FLASH FROM MOLDED PRODUCTS

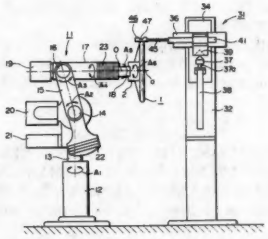
Sadao Kobayashi; Hidemi Tomono, and Kazunobu Yoshida, all of Shizuoka, Japan, assignors to Nihon Plast Co., Ltd., Fuji, Japan

Filed Sep. 19, 1988, Ser. No. 196,133

Claims priority, application Japan, May 22, 1987, 62-125397

Int. Cl.[5] B23B *3/04*

U.S. Cl. 82—101 **20 Claims**



1. An apparatus for removing flash from a molded product comprising:

a cutter means;

a cutter carrier means for carrying said cutter means to a predetermined working position at which flash is removed from said molded product, said carrier means being supported in free movement;

a work carrier means for holding said molded product, for moving said molded product to said working position and for shifting said molded product relative to said cutting means at said working position to establish contact between a portion of said molded product where flash thereof is to be removed and said cutter means; and

means for depressing said cutter means onto said portion of said molded product with a predetermined magnitude of force.

4,995,287

APPARATUS FOR CUTTING LAMINATED SHEET MATERIAL

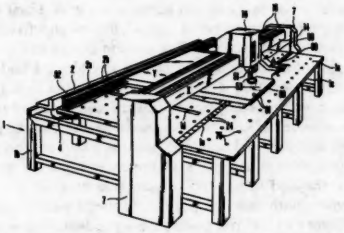
Nobuo Nasu, Fukuyama, Japan, assignor to Kabushiki Kaisha Kawakami Seisakusho, Hiroshima, Japan

Division of Ser. No. 177,968, Apr. 5, 1988. This application Dec. 19, 1989, Ser. No. 452,785

Claims priority, application Japan, Apr. 23, 1987, 62-100955

Int. Cl.[5] B26D *7/01*; D06H *7/00*

U.S. Cl. 83—169 1 Claim



1. An apparatus for cutting sheet material, comprising:

(a) means defining a support surface for supporting the sheet material to be cut, said support surface having an elongated guide groove recessed therein, said groove having parallel sidewalls;

(b) means for reciprocally supporting a cutting element disposed in the sheet material;

(c) means for moving said reciprocating cutting element supporting means in a direction normal to the direction of reciprocation of said cutting element and axially of said elongated guide groove;

(d) a movable support strip supported in said guide groove and disposed relative to said cutting element supporting means to receive the end of the cutting element after passing through the sheet material, said movable support strip including means for receiving the end of said cutting element;

(e) means for moving said strip along said guide groove in the direction of movement of said cutting element support and in synchronism with such movement, said strip having parallel sidewalls disposed adjacent mating sidewalls of said guide groove, thereby providing an uninterrupted coplanar support surface at the location of said movable strip on said support surface; and

wherein said guide groove has a recessed shoulder associated with each sidewall thereof, and said support strip has a thickness at its lateral edges equal to the depth of said shoulders from said support surface, whereby the bottoms of the lateral edges of said support strip slidably engage said shoulders, and the top surface of said support strip is flush with said support surface.

4,995,288

SAW GUIDE

Michael DellaPolla, 1048 W. Mill Dr., Kennesaw, Ga. 30144

Continuation-in-part of Ser. No. 252,903, Oct. 3, 1988, abandoned. This application Aug. 15, 1989, Ser. No. 369,540

Int. Cl.[5] B26D *5/08*

U.S. Cl. 83—574 7 Claims

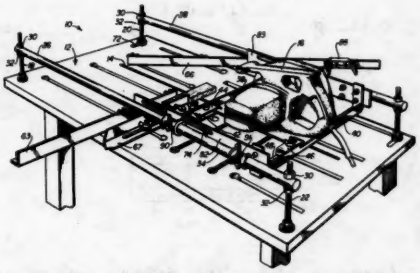
1. A saw guide comprising:

(a) a base having a flat upper surface;

(b) a pair of parallel guide rails affixed to said base by a rail supporting means, each guide rail having a forward and a rearward end;

(c) a saw carriage assembly capable of holding a saw or other power tool, slidably mounted to said guide rails, said guide rails maintaining said saw in a predetermined path when said saw assembly is slid along said guide rails; and

(d) said rail supporting means attaching at the first end to said base and at the second end to said guide rails; said rail supporting means having a calibration means that allows said guide rails to be adjusted vertically from a known starting point on said supporting means a known given amount wherein said rail supporting means of at least one



guide rail are adjustably attached to said base in a lateral axis in order to maintain a given distance between said guide rails to prevent the saw carriage assembly from binding when said guide rails are at differing heights.

4,995,289

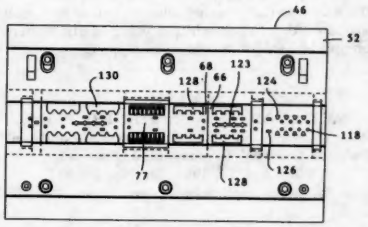
DIE ASSEMBLY HAVING IMPROVED INSERT RETAINING SYSTEM AND HAVING REVERSIBLE DIE INSERTS

Johannes C. W. Bakermans, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jul. 7, 1989, Ser. No. 376,485

Int. Cl.[5] B26F *1/14*

U.S. Cl. 83—690 13 Claims



1. A die assembly having a facial surface, a recess in the facial surface and die insert means in the recess, the die assembly being characterized in that:

the recess extends entirely across the facial surface from a first end thereof to a second end, the insert means comprises a plurality of inserts in side-by-side relationship between the ends of the recess,

a pair of parallel spaced apart retaining plates are provided on the facial surface which extend parallel to, and which overhang, the recess, one of the retaining plates being movable parallel to, and on, the facial surface between a retaining position and a retracted position,

at least two spacers are provided in the recess for locating the inserts, the spacers and the one retaining plate having interengaging portions which precisely locate the spacers in the recess, the interengaging portions being effective to retain the spacers in the recess when the one plate is in its retaining position, the spacers being removable from the recess when the one plate is in its retracted position, the inserts being removable from the recess after removal of the spacers by sliding the inserts past one of the ends of the recess.

4,995,290

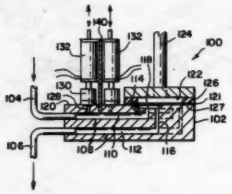
APPARATUS AND METHOD FOR CONTROLLING A PNEUMATICALLY POWERED MUSIC-MAKER

Norman Heischober, Massapequa, and Paul Keogler, Valley Stream, both of N.Y., assignors to H. & K. Automated Musical Creations Co., Massapequa Park, N.Y.

Filed Jun. 7, 1989, Ser. No. 362,615

Int. Cl.[5] G10F *5/04*

U.S. Cl. 84—160 7 Claims



1. An apparatus for controlling a mechanical music-maker of the type using a vacuum as the motive force for driving a multiplicity of mechanical actuators, each mechanically actuating a corresponding musical key, the music-maker includes a multiplicity of valves for connecting the vacuum to the multiplicity of mechanical actuators when opened, the valves being held closed by a vacuum applied to a vacuum side thereof and opened upon having the vacuum side thereof vented to atmosphere, the music-maker including a first means for opening the valves by coupling the vacuum side of selected valves to atmosphere, the apparatus further comprising:

second means for opening the valves by coupling the vacuum side of selected valves to atmosphere;

said second means including an electrically energizable solenoid valve directly connected to said vacuum side of each of said valve means and venting said vacuum side to atmosphere upon energization of the solenoid thereof; and

selector means for selectively isolating said first means from the valves so that opening selected valves by coupling the vacuum side of each selected valve to atmosphere is accomplished solely by said second means.

4,995,291

ACTION MECHANISM FOR THE PIANO

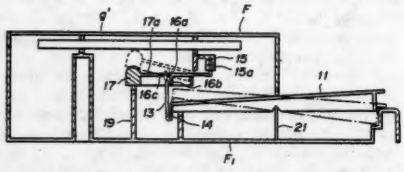
Fumitaka Takahashi, Shizuoka, Japan, assignor to Kawai Gakki Seisakusho Co., Ltd., Hamamatsu, Japan

Filed Aug. 24, 1989, Ser. No. 397,897

Claims priority, application Japan, Aug. 29, 1988, 63-112070[U]

Int. Cl.[5] G10C *3/18*

U.S. Cl. 84—237 6 Claims



1. A piano action including, in combination, a hammer having a horizontal shank including a base end mounted for free angular displacement to swing said hammer, in a vertical plane between rest and actuated positions, an elongated horizontal key having a first finger engagable end and a second hammer actuating end and mounted, intermediate its opposite ends, beneath said shank for rocking oscillatory movement of said key in a vertical plane between first and second limit positions, said second end including an upstanding jack, having upper and lower ends, supported therefrom and displaced upwardly toward said base end during movement of said key from said first position toward said second position, the lower end of said jack being supported from said second end for limited angular displacement of said upper end toward and away from said base end and yieldingly biased toward said base end, said shank base end defining a substantially right angle seat including a first portion extending along said shank and facing downward toward and engagable by the upper end of said jack and a second horizontally facing portion defining an abutment spaced below said first portion and facing along a path extending beneath said first portion and toward said hammer, said upper end, when said key and hammer are in said first and rest positions, respectively, being spaced below said first portion and engagable with the said first portion during initial upward movement of said second end of said key toward said second position, for elevating said first portion, and thus swinging said hammer from said rest position toward said actuated position, upon movement of said hammer past a predetermined position between said rest and actuated positions, said second portion being operable to engage said upper end and to angularly displace the said upper end toward said hammer and out of engagement with said first portion, to thereby allow said hammer to return to said rest position independent of return movement of said key to said first position.

4,995,292

STRING VIBRATION DETECTING DEVICE FOR ELECTRONIC STRINGED INSTRUMENT

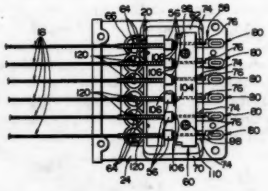
Yoshio Nomura, Oome, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed Mar. 10, 1989, Ser. No. 321,737

Claims priority, application Japan, Mar. 22, 1988, 63-36411[U]; Sep. 1, 1988, 63-115211[U]

Int. Cl.[5] G10H *3/18*

U.S. Cl. 84—726 14 Claims



14. A string vibration detecting device for an electronic stringed instrument, comprising:

a string support unit arranged on an instrument body unit;

at least one string member supported by said string support unit;

a cylindrical member for covering at least a portion of an outer surface of said string member to follow vibrating movement of said string member, one end portion of said cylindrical member being detachably mounted to said string support unit, and said cylindrical member being made of such a material that its movement can be detected electro-magnetically and

string vibration detecting means arranged on said instrument body unit in operative relation with the cylindrical member, for electro-magnetically detecting vibration of said cylindrical member.

4,995,293

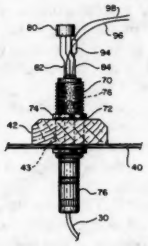
ACOUSTIC INSTRUMENT WITH INTERNALLY POSITIONED MICROPHONE MEANS FOR RECEIVING ACOUSTICAL VIBRATIONS

Peter N. Anderson, 1571 El Camino, #39, Mountain View, Calif. 94040

Continuation of Ser. No. 186,726, Apr. 22, 1988, abandoned, which is a continuation of Ser. No. 746,987, Jun. 19, 1987, abandoned, which is a continuation-in-part of Ser. No. 696,327, Jan. 30, 1985, abandoned. This application Jul. 13, 1989, Ser. No. 378,465

Int. Cl.[5] G10H *3/18*

U.S. Cl. 84—733 14 Claims



1. In an acoustic instrument, the apparatus comprising

electrical jack means carried within the body of said acoustic instrument, said electrical jack means having self-tapping threads formed thereon to provide an intimate contact over an extended area between the body of said jack means and the material of said acoustic instrument, thus enabling secure installation of the jack means completely from the exterior of the instrument without need for internal locking or tightening, and

condenser microphone means directly connected and supported by said electrical jack means in close proximity to one end of said electrical jack means within said acoustic instrument such that said microphone means is located sufficiently close to the internal body of said acoustic instrument but spaced therefrom for generating electrical signals corresponding solely to the natural or true undistorted acoustic sound within said acoustic instrument when said instrument is played.

4,995,294

ELECTRONIC PERCUSSION INSTRUMENT

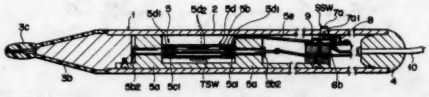
Yukio Kashio, Tokyo, and Yoneaki Arai, Hanno, both of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 53,384, May 22, 1987, abandoned. This application Aug. 29, 1989, Ser. No. 401,526

Claims priority, application Japan, May 26, 1986, 61-120724; Jun. 30, 1986, 61-98967[U]; Jul. 9, 1986, 61-104238[U]; Sep. 10, 1986, 61-138883[U]

Int. Cl.[5] G10H *1/02*

U.S. Cl. 84—738 18 Claims



1. An electronic percussion instrument, comprising:

a stick-shaped striker which is operated in a striking manner or swinging manner;

musical sound initiating command signal generating means provided in said stick-shaped striker and including switching means for performing switching actions each time said striker is operated in the striking manner or in the swinging manner, and a signal generator for generating a musical sound initiating command signal each time said switching means performs a switching action; and

a musical sound producing unit for producing a musical sound with a preset timbre each time the musical sound initiating command signal is generated by said command signal generating means,

wherein said musical sound-initiating command signal generating means comprises:

a conductive member held rigidly within the striker;

a plurality of insulating members securely fitted on the outer surface of said conductive member at a predetermined distance; and

an elastic and conductive member arranged in such a manner that its middle portion is separated from said conductive member by said plurality of insulating members when the striker is not used, and comes into electrical contact with said conductive member when the striker is striking or swinging.

4,995,295

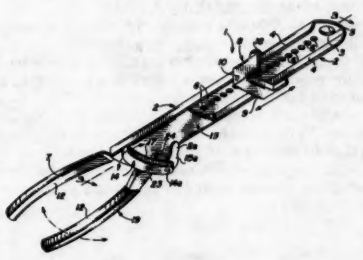
LID WRENCH

Fred D. Floyd, 1403 Fairview Ave., Monroe, La. 71201

Continuation-in-part of Ser. No. 375,678, Jul. 5, 1989, Pat. No. 4,949,576. This application Apr. 9, 1990, Ser. No. 506,158

Int. Cl.[5] B07B *7/00*

U.S. Cl. 81—3.44 28 Claims



1. A lid wrench for removing a lid from a container, comprising a lug support; a plurality of openings provided in said lug support; lug means pivotally carried by said lug support, said lug means adapted to selectively engage and disengage said openings in slidably adjustable relationship; a fixed handle carried by said lug support in fixed relationship; jaw means pivotally carried by said lug support in spaced relationship with respect to said lug means; and a jaw handle carried by said jaw means in fixed relationship, whereby said lug means and said jaw means engage the lid and the lid is loosened on the container responsive to insertion of said lid wrench over the lid between said lug means and said jaw means, squeezing said jaw handle toward said fixed handle and twisting said lid wrench in the counterclockwise direction.

4,995,296

LARGE TIRE BOLT FIXING TOOL

Sheng N. Chen, 3th Floor, No. 8, Alley 1, Lane 32, YiShin 2nd Rd., Kaohsiung, Taiwan

Filed Jan. 23, 1990, Ser. No. 469,016

Int. Cl.[5] B25B *21/00*

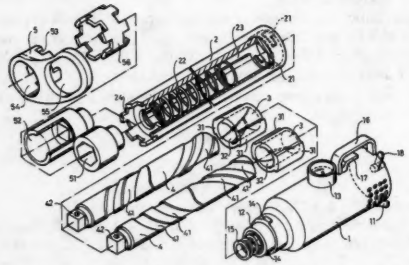
U.S. Cl. 81—57.44 2 Claims

1. A wheel bolt rotating tool comprising:

a compressed air cylinder having an inlet valve for leading in compressed air, a tubular shaft extensible outward from the cylinder by the action of compressed air, a spring contained in the tubular shaft to push a rotating shaft, a first element of a bayonet fitting to releasably attach the

cylinder with a position tube and a handle for gripping the cylinder;

a position tube having a second element of the bayonet fitting at one end to combine releasably with the first element on the cylinder, teeth at the other end to engage releasably with a bolt fitter, a helical spring contained in the interior of the position tube which also contains an orientation tube and a rotating shaft, the spring and orientation tube being arranged end to end around the shaft, at least one linear groove in the inner surface of the position tube for receiving a projecting section on the outer surface of the orientation tube;



the orientation tube further provided with at least one helical projection in the inner surface to engage with a helical groove in the rotating shaft;

the rotating shaft having an outer end fitting in a removable bolt-engageable cap;

a bolt fitting having teeth to engage releasably with the teeth on the position tube, and a round hole for receiving said cap to fit and rotate therein; and

the tubular shaft in the cylinder capable of being pushed forward by compressed air coming through the inlet valve so that the rotating shaft can be rotated by forward movement of the orientation tube and the cap fitted at the front end of the rotating shaft can be rotated to rotate a bolt fitted in the cap.

4,995,297

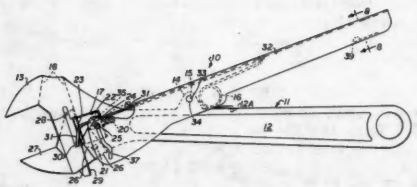
LOCKING RATCHET WRENCH

John E. Richards, 16307 Summerwind, Houston, Tex. 77090

Filed Jul. 12, 1989, Ser. No. 378,783

Int. Cl.[5] B25B *13/12, 7/14*

U.S. Cl. 81—126 **14 Claims**



1. A locking ratchet wrench comprising;

a main body having an elongate handle portion with an integral stationary jaw at one end and a slotted guideway extending between the top and bottom surfaces of said stationary jaw,

an opening having a rear wall, extending transversely through said stationary jaw and rearwardly from said slotted guideway,

a movable jaw slidably fitted in said guideway for movement toward and away from said stationary jaw and having ratchet teeth at the rearward end thereof,

a locking pawl block member slidably retained for forward and rearward movement within said opening and having said teeth at the forward end thereof corresponding to said movable jaw ratchet teeth and movable into and out of engagement with said movable jaw ratchet teeth,

locking pawl spring means between said opening rear wall and said locking pawl block member to normally urge the same forwardly away from said rear wall,

an elongate movable handle pivotally mounted on said main body and having a front portion with sides which are slidably received on each side of said opening and operativly connected to said locking pawl block member to move the same into and out of toothed engagement with said movable jaw,

jaw control spring means operatively connected between said movable jaw and said movable handle to apply upward pressure on said movable jaw to urge said movable jaw toward said stationary jaw, and

handle return spring means operatively connected between said main body and said movable handle to normally urge the rear portion of said movable handle pivotally away from the handle portion of said main body when the handles are not being gripped together, whereby

when said movable handle is pivoted away from said handle portion the teeth of said locking pawl block member are disengaged from the teeth of the movable jaw allowing the jaws to be moved for placing around a nut or bolt, and

as said movable handle is pivoted toward said handle portion, said jaw control spring means applies upward pressure on the movable jaw to bias it against a nut or bolt to be turned, and subsequent movement of said movable handle moves said movable jaw toward the closed position to firmly grip the nut or bolt allowing it to be turned in either direction.

4,995,298

APPARATUS FOR ROTATABLY SUPPORTING AND FEEDING ELONGATED ROD MEMBER

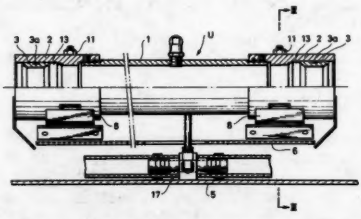
Tomokichi Arisaka, and Mitsuyoshi Yamaguchi, both of Nagano, Japan, assignors to Kabushiki Kaisha ALPS Tool, Japan

Filed Oct. 21, 1987, Ser. No. 112,094

Claims priority, application Japan, Oct. 24, 1986, 61-253271; May 28, 1987, 62-129946

Int. Cl.[5] B23B *5/14*

U.S. Cl. 82—127 **4 Claims**



1. An elongated rod member supporting apparatus provided in a rod feeding machine having a frame for feeding and rotatably supporting said elongated rod member to a working machine, said apparatus comprising:

a plurality of rod supporting units each positioned spaced away and arranged along a length of said rod feeding machine, each of said rod supporting units having both

axial end portions provided with bearing portions for rotatably supporting said elongated rod member;

damper means provided between each of said rod supporting units and said frame for elastically supporting said rod supporting units;

means for supplying oil to each space defined betweens said bearing portions said elongated rod member;

each of said rod supporting units comprising a bushing support for internally supporting said bearing portions, said bushing support being supported by said damper means;

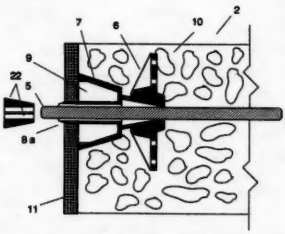
each of said bearing portions being formed with an annular groove, and further comprising a locking pin engageable with said annular groove and a coil spring interposed between said brushing support and said bearing portion, each of said bearing being urged toward axial ends of said rod supporting unit by said coil spring.

4,995,299

TORQUE TRANSMITTING TOOL FOR REMOVING GROMMETS FROM CONCRETE

Gary M. Rarden, 9313 13th Pl. SE., Everett, Wash. 98205

Filed May 25, 1990, Ser. No. 528,440
Int. Cl.[5] B25B *13/48*
U.S. Cl. 81—176.15 **7 Claims**



1. A tool for transmitting torque in combination with a grommet embedded in concrete and a portion of a cable extending outwardly from said grommet for post tensioning the concrete, said grommet having an open cavity and at least one wing extending transverse across the entire length of said cavity, said tool comprising:

a head portion for insertion into said cavity of said grommet, said head portion comprising a body, said body having an outer peripheral surface and a longitudinal bore therethrough, said body further comprising an open notch extending radially from said bore to said peripheral surface for allowing said body to be placed around said cable and inserted into said cavity of said grommet,

a means for transmitting torque to said grommet extending outwardly from said head portion, said torque transmitting means of a length to transmit torque across the entire length of said wing of said grommet to dislodge said grommet from an embedded position;

a handle for rotating said head portion.

4,995,300

LATHE FOR GENERATING ASPHERICAL SURFACES ON WORK PIECES

Samuel S. Kaplan, Orlando, Fla., and Donald S. Dill, Lancaster, Ohio, assignors to Chariot Star, Inc., Orlando, Fla.

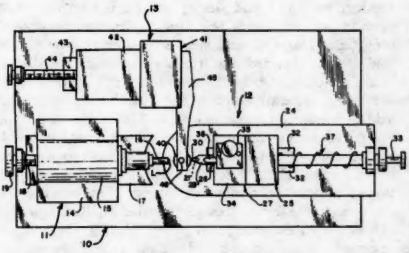
Filed Apr. 28, 1989, Ser. No. 345,418
Int. Cl.[5] B23B *7/00*
U.S. Cl. 82—12 **5 Claims**

1. A lathe for generating surfaces of revolution on a work piece comprising

a base;

a spindle assembly mounted on said base and including an elongated, rotatably supported spindle having a longitudinal axis and an end for mounting of a work piece thereon and means for rotating said spindle, said spindle axis being disposed in a predetermined plane;

a turret assembly mounted on said base and including a rotatable base mount for pivotally supporting said turret assembly about a vertical axis of rotation disposed transversely to said spindle axis, a cam follower and cutting tool support assembly secured to said base mount for relative displacement along an axis of displacement in a plane disposed in transverse relationship to said vertical axis of rotation of said turret assembly, a cam follower



having an end portion of V-shaped configuration having an apex and side walls divergent from said apex, a cutting tool and resilient biasing means for urging said cam follower and cutting tool support assembly in a predetermined direction along said axis of displacement, and

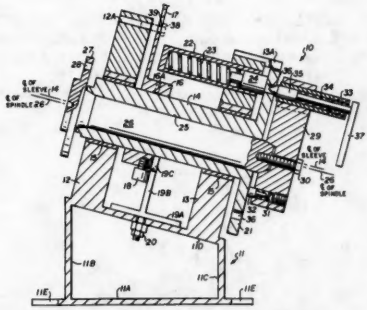
a control cam assembly mounted on said base and including a roller cam carried by a support assembly for supporting and positioning said roller cam for free rotation about an axis of rotation parallel to the axis of rotation of said turret assembly, said roller cam having a cylindrically shaped surface against which said cam follower bears.

4,995,301

TRI-MOTION GRINDING FIXTURE

Douglas B. Phillips, Sr., 4124 Greenleaf, Spring, Tex. 77389

Filed Dec. 14, 1989, Ser. No. 450,678
Int. Cl.[5] B24B *19/16*
U.S. Cl. 51—219 R **14 Claims**



1. A fixture for holding and positioning reamers, bits, and the like for grinding and adapted for operation relative to a rotating grinding wheel positionable at selective angles relative to a flat horizontally surface, said fixture comprising:

a support base having a lower portion adapted for connection to a flat horizontal surface and an upper portion positioned at a selective angle relative to the horizontal surface,

a longitudinal cylindrical sleeve rotatably mounted on the upper portion of said support base and having an eccentric

longitudinal bore and a radial flange portion at its rearward end,

a longitudinal cylindrical spindle rotatably received within said sleeve eccentric bore and having a mounting flange at its forward end adapted to receive a chuck for holding the reamer or other object to be ground and a rear flange reassembly secured to the rear end of the spindle adjacent said sleeve radial flange,

handle means operatively connected on said sleeve for rotating said sleeve about its longitudinal axis relative to said support base,

an axial guide flange operatively connected between said support base and said sleeve and having an upstanding portion positionable at selective angles transverse to the longitudinal axis of said sleeve to simultaneously move said sleeve forward and rearward a selective distance along its longitudinal axis upon rotation of said sleeve,

roller means operatively connected with said handle and said sleeve and engageable with said guide flange upstanding portion such that when said handle means is pivoted said sleeve will rotate about its longitudinal axis and said roller means rolling across the angularly transverse positioned upright portion of said guide flange causes said sleeve to move forward or rearward along its longitudinal axis as it rotates, and

engagement means operatively connected between said spindle and said sleeve for selectively locking said spindle with said sleeve for rotational movement as a single unit about the longitudinal axis of said sleeve or releasing said spindle from said sleeve for rotating only said spindle about its longitudinal axis relative to said sleeve,

said spindle being eccentrically mounted in said sleeve such that the longitudinal axis of said spindle will rotate partially about the centerline of said sleeve when said spindle and said sleeve are locked together whereby the reamer or other object being ground is eccentrically rotated in a radial spiral motion when said handle means is pivoted, and

when said axial guide flange upstanding portion is angularly positioned said reamer or other object being ground will move forward or rearward in a radial spiral motion as said handle means is pivoted, and

when said spindle and said sleeve are unlocked from one another the reamer or other object being ground may be rotated only about its own longitudinal axis.

4,995,302

NEGATIVE PRESSURE BOOSTER EQUIPMENT

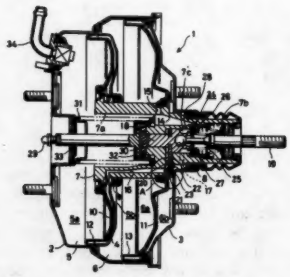
Haruo Suzuki, and Atushi Satoh, both of Higashimatsuyama, Japan, assignors to Jidosha Kiki Co., Ltd, Tokyo, Japan

Filed Sep. 19, 1989, Ser. No. 409,472

Claims priority, application Japan, Sep. 21, 1988, 63-238166

Int. Cl.[5] F15B *9/10*

U.S. Cl. 91—369.3 **5 Claims**



1. A negative pressure booster equipment, comprising a front shell and a rear shell defining a space therebetween, a predetermined number of center plates dividing said space into two or more chambers, a valve body air-tightly and slidably passing through said center plates, power pistons equal in number to said two or more chambers each arranged to divide said chambers respectively into constant pressure chambers where negative pressure is introduced and variable pressure chambers where air under atmospheric pressure is introduced, a valve plunger with an input shaft connected thereto both slidably mounted within said valve body, communication means for communicating between said constant pressure chambers and said variable pressure chambers, a first pathway for communicating said variable pressure chambers with atmosphere air, control valve means for controlling said communication means and said first pathway, a second pathway communicating between said variable pressure chambers, a variable orifice means provided in said second pathway for varying an amount of air passage to at least one of said variable pressure chambers relative to other variable pressure chambers by gradually decreasing said amount of air passage when said valve plunger is moved forward relative to said valve body and gradually increasing said amount of air passage when said valve plunger is moved backward relative to said valve body.

4,995,303

SENSOR-EQUIPPED ACTUATOR FOR POWER CHUCK

Günter H. Röhm, Heinrich-Röhm-Strasse 50, D-17927 Sontheim, Fed. Rep. of Germany

Filed Jan. 8, 1990, Ser. No. 461,987

Claims priority, application Fed. Rep. of Germany, Sep. 1, 1989, 3929011; European Pat. Off., Oct. 18, 1989, 89119302.1

Int. Cl.[5] F01B *25/26*

U.S. Cl. 92—5 R **13 Claims**

1. A power actuator comprising:

a hollow cylinder housing generally centered on an axis;

a piston axially displaceable but nonrotatable in the housing and defining therein a pair of axially opposite pressurizable compartments;

a piston stem centered on the axis, fixed to the piston, extending axially from the piston, and formed with a pair of separate feed passages each having one end opening into a respective compartment and an opposite end opening axially on the stem;

a distributor body rotatable about the axis on the stem at the opposite ends of the passages but axially nondisplaceable on the stem, the body being provided with respective connections communicating with the opposite ends, whereby the compartments can be pressurized via the respective passages and connections for axial movement of the piston and stem in the housing;

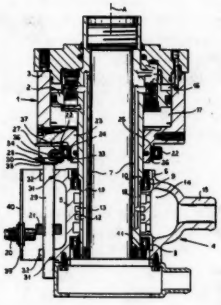
a pair of axially spaced guides fixed on the distributor body;

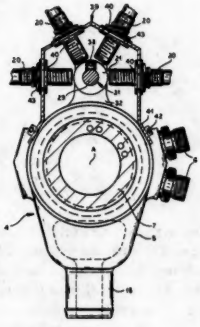
a bearing having a race axially rotatable on the housing about the axis but axially nondisplaceable on the housing;

an axially extending rod axially displaceable in the guides on the distributor body and having a front end juxtaposed with the race;

means interconnecting the front end of the rod and the race for permitting limited relative radial movement between

the rod front end and the race and for prohibiting relative axial movement between the rod front end and the race;
an actuating element coupled to the rod; and





a sensor fixed on the distributor body and actuatable by the element of the rod.

4,995,304

EXTENDABLE CYLINDERS OF ELASTICALLY VARIABLE LENGTH FOR USE IN A PUMP

Berthold Daimler, Remscheid, Fed. Rep. of Germany, assignor to Firma Carl Freudenberg, Weinheim, Fed. Rep. of Germany

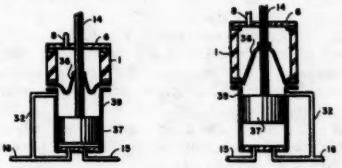
Division of Ser. No. 804,155, Dec. 3, 1985, abandoned. This application Dec. 28, 1987, Ser. No. 117,048

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1984, 3444978; Jul. 3, 1985, 3523717

Int. Cl.[5] F01B *19/04*

U.S. Cl. 92—92 **14 Claims**

1. A pumping device comprising, in combination:
(a) an extendible cylinder having a cylindrical wall which is extendible in the axial direction and having means, embedded in said cylindrical wall, for reinforcing said extendible cylinder against radial expansion or contraction in response to an overpressure or underpressure, respectively, inside said extendible cylinder;
(b) a first cover disposed at, and closing one end of said extendible cylinder;
(c) a rigid pumping cylinder mounted on the end of said extendible cylinder which is opposite to said one end;
(d) a piston disposed in said rigid cylinder and arranged to move slidably within said rigid cylinder;
(e) a piston rod, extending through said extendible and rigid cylinders between said first cover and said piston;
(f) a second cover disposed at, and closing the end of said rigid cylinder that faces away from said extendible cylinder, said second cover having at least one fluid opening to permit a fluid to enter the pumping space within said rigid cylinder between said piston and said second cover; and



(g) flexible membrane connected across the coupled, facing ends of said extendible cylinder and said rigid cylinder, said membrane having a hole therethrough for the passage of said piston rod, said membrane being attached in a leakproof manner to said facing cylinder ends and said piston rod to prevent fluid from passing from one side thereof to the other.

4,995,305

ACTUATOR EMPLOYING A FLUID UNDER PRESSURE FOR THE DRIVING IN ROTATION OF A ROTARY SHAFT

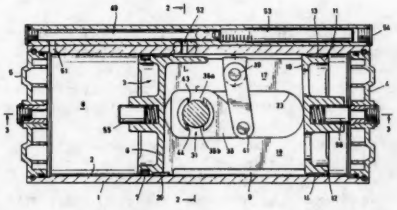
Jean-Claude Garrigues, Cadaujac; Rene Laulhe, Villenave D'Ornon, and Pierre Rieuvernet, Merignac, all of France, assignors to Applications Mecaniques et Robinetterie Industrielle, Bagnolet Cedex, France

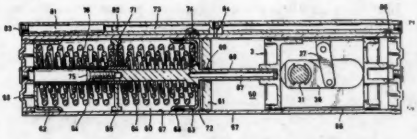
Filed Mar. 9, 1989, Ser. No. 321,195

Claims priority, application European Pat. Off., Mar. 9, 1988, 88400548

Int. Cl.[5] F01B *9/00*

U.S. Cl. 92—138 **5 Claims**





1. Actuator using a pressurized fluid, for driving a rotary shaft in rotation comprising:
a one piece tubular body having a cylindrical bore;
a piston slidable within said bore and comprising;
a circular member having a sealing ring on the periphery of the member providing a sliding seal with the cylindrical surface of the bore, said member defining, inside said bore, two chambers at least one of which forms a work

chamber into which opens a conduit for the intake of pressurized fluid,

a guide element sliding in the bore, without providing sealed separation of the volume defined by said bore,

said guide element being connected to the closure member by four longitudinal members disposed symmetrically with respect to the longitudinal axis of symmetry of the bore so as to define at least one free volume of cruciform section having a first and second perpendicular branches;

a control shaft extending inside said bore and passing through at least one orifice provided in said body and through said first branch; and

means for converting said rectilinear movement of the piston into a rotary movement of said control shaft comprising;

at least one link having one end articulated to the piston and the other end to a lever arm fixedly mounted on said control shaft,

said link and said arm extending in planes orthogonal to the axis of said control shaft, said lever arm and said link moving in said second branch.

4,995,306

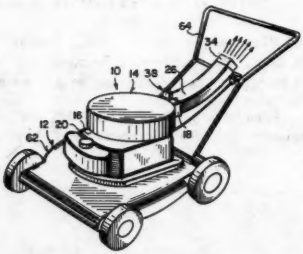
AIR CIRCULATING SYSTEM FOR A PERSON OPERATING AN ENGINE POWERED PIECE OF AGRICULTURAL EQUIPMENT

Robert E. Rush, 560 Mellon Bridge Rd., Oxford, Ala. 36203

Filed Jan. 18, 1990, Ser. No. 467,010

Int. Cl.[5] B60H *3/06*

U.S. Cl. 98—1 **5 Claims**



1. An air circulating system for a person operating an engine powered piece of agricultural equipment, said system comprising:

(a) a housing having an air inlet port and an air outlet port, said housing mounted onto the piece of agricultural equipment adjacent the engine;

(b) a fan rotatably carried within said housing;

(c) means between the engine and said fan, for rotating said fan;

(d) an elongated duct connected to the air outlet port of said housing for directing air driven by said fan towards the person to increase the rate of evaporation of perspiration thus keeping the person cooler while operating the agricultural equipment to afford a degree of comfort during hot days;

(e) a filter carried in the air inlet port of said housing for removing dust particles from the air entering said housing;

(f) a screen carried on the air inlet port of said housing below said filter for removing larger foreign particles from the air entering said housing;

(g) a discharge outlet member affixed to the distal end of said elongated duct, said discharge outlet member having a plurality of vertical slots therein to diffuse the air driven be said fan towards the person;

(h) means for selectively closing the air outlet port of said housing so as to stop the flow of air into said elongated duct, when the circulation of air is not desired, debris is being blown into the air by wind and additional power consumed by said fan is needed by the agricultural equipment; and

(i) said selectively closing means is an insertable filter gate valve carried in the air outlet port of said housing having a filter area on one half thereof and a solid area on the other half thereof so that when said filter area is inserted within the air outlet port more dust particles will be removed from the air leaving said housing and when said solid area is inserted within the air outlet port it will closed the air outlet port and stop the flow of air from within said housing through said elongated duct.

4,995,307

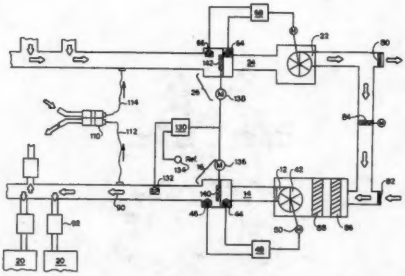
VARIABLE AIR VOLUME VENTILATION SYSTEM AND METHOD

Bobby Floyd, 5N060 Medinah Rd., Addison, Ill. 60101

Filed Sep. 11, 1989, Ser. No. 405,762

Int. Cl.[5] F24F *7/08*

U.S. Cl. 98—34.5 **11 Claims**



1. In a ventilation system for a building having a supply duct to a building space, a return duct from a building space, a supply fan and a return fan, the improvement comprising:

a first flow control unit positioned within the supply duct and a second flow control unit positioned within the return duct, said flow control units including an orifice, a first static pressure sensor positioned upstream of said orifice and a second static pressure sensor positioned downstream of said orifice to provide signals responsive to the sensed pressure on the opposite sides of said orifice, and a controller for providing an output responsive to the differential in the said sensed pressure;

first damper means positioned in said supply duct and operably connected to said controller of said first control unit to provide control of air flow therethrough in response to said sensed pressure differential in said first flow control unit;

second damper means positioned in said return duct and operably connected to said controller of said second flow control unit to provide control of air flow therethrough in response to said sensed pressure differential in said second control unit;

a remote static pressure sensor positioned downstream of said first flow control unit for providing an output signal responsive to the sensed pressure at said remote location;

a remote controller for providing a signal responsive to the difference between said sensed static pressure and a reference pressure; and

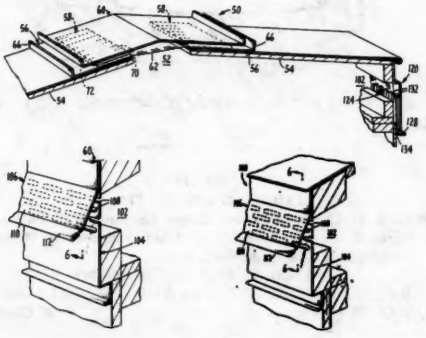
first and second motor controlled dampers positioned within said first and second flow control units respectively and operably connected to said controller to respond to said controller output signal to vary the damper openings in said flow control units in the respective supply and return ducts in response to said remote controller.

4,995,308

ROOF VENTILATING APPARATUS

Richard L. Waggoner, Riverside, Calif., assignor to Alumax Inc., San Mateo, Calif.

Filed May 24, 1989, Ser. No. 356,432
Int. Cl.[5] F24F 7/02
U.S. Cl. 98—37 4 Claims



1. For ventilating a building through a roof having a gap extending transversely along the cornice of the roof, a fascia ventilator comprising:

ventilating means for allowing air to pass between an interior building space below the roof and the building exterior, said ventilating means comprising a ventilating member configured for receipt over the gap in the cornice and provided with a plurality of apertures; and

a cover member configured for receipt by the cornice above the gap and for extending down over but spaced apart from said ventilating member, said cover member provided with a drip lip to prevent precipitation shed by the roof from running down a wall of the building.

3. For ventilating a building through a roof having a gap extending transversely along the cornice of the roof, a fascia ventilator comprising:

ventilating means for allowing air to pass between an interior building space below the roof and the building exterior, said ventilating means comprising a corrugated ventilating member configured for receipt by the cornice beneath the gap; and

closure means for covering the cornice gap and for joining with said ventilating means to define a plurality of substantially parallel closed channels through air may pass.

4,995,309

RADON GAS EXHAUST SYSTEM

Steven K. Weaver, Carmel, Ind., assignor to Radon Control, Inc., Carmel, Ind.

Filed Jan. 25, 1990, Ser. No. 470,145
Int. Cl.[5] F24F 7/013
U.S. Cl. 98—42.07 15 Claims

9. A reversible exhaust system for removing radon gas from a building comprising:

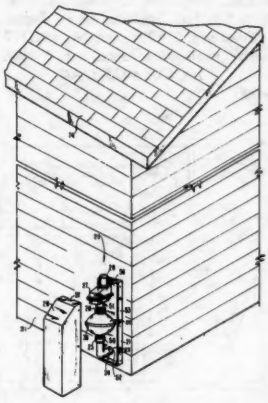
a base plate mountable exteriorly to said building;

a first tube spaced apart from said building;

a fan coupled to said first tube;

a second tube positionable adjacent said building;

a reversible transition box coupling said fan and said second tube, said box mountable to said base plate in one position to extend said second tube upwardly over said transition box and in an second position to extend said second tube downwardly beneath said transition box; and,



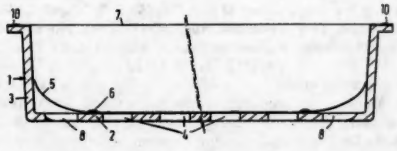
a housing enclosing said reversible transition box and said fan mounted to said base plate.

4,995,310

DISPOSABLE FILTER CARTRIDGE, WHETHER OR NOT COMBINED WITH A WATER RESERVOIR

Joost van der Lijn, Utrecht, and Bernardus M. Van Thoor, Maarsenbroek, both of Netherlands, assignors to Douwe Egberts Koninklijke Tabaksfabriek-Koffiebranderijen-Theehandel N.V., Utrecht, Netherlands

Continuation of Ser. No. 928,969, Nov. 10, 1986, Pat. No. 4,860,645. This application May 5, 1989, Ser. No. 303,860
Claims priority, application Netherlands, Nov. 11, 1985, 8503092; Apr. 16, 1986, 8600958
Int. Cl.[5] A47J 31/06
U.S. Cl. 99—295 7 Claims



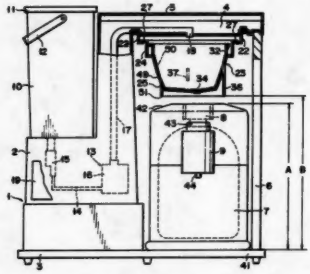
1. A disposable filter cartridge comprising a housing including a bottom and an upright side wall, the bottom having at least one hole formed therein, said filter cartridge being provided at its top and bottom with filter material, the bottom filter material being cup-shaped and connected to the housing by a sealed joint, a space being formed outwardly of the sealed joint between the housing and the cup-shaped bottom filter material, said space being in open communication with said at least one hole in the bottom.

4,995,311

DEVICE FOR MAKING LIQUID COFFEE

Masaru Naya, Tama; Masayuki Kuzumaki, Machida, and Susumu Ishikawa, Sakai, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki; Koyusha Co., Tokyo and Kanazawa Industry Co. Ltd., Sashima, all of, Japan

Filed Sep. 5, 1989, Ser. No. 402,777
Claims priority, application Japan, Sep. 5, 1988, 63-221631
Int. Cl.[5] A47J *31/00*
U.S. Cl. 99—295 9 Claims



1. A device for making liquid coffee comprising:

a main body having a bracket section;

a dripper attached to the bracket section of the main body, said dripper having a filter attached thereto and an outlet formed at the bottom thereof and containing coffee powder therein;

a liquid coffee receiver located under the dripper and having an opening which is opposed to the outlet of the dripper at a certain interval; and

a means for supplying hot water into the dripper to make liquid coffee, which is collected in the liquid coffee receiver, passing through the outlet of the dripper and the opening of the liquid coffee receiver;

said dripper including a holder attached to the bracket section of the main body, a means connected to the holder and movable up and down, said means serving to enclose the space between the outlet of the dripper and the opening of the liquid coffee receiver to thermally shield liquid coffee flowing through the space from outside air when it is at its lower position, and guide means formed on the holder to guide the outside air shielding means downward and upward.

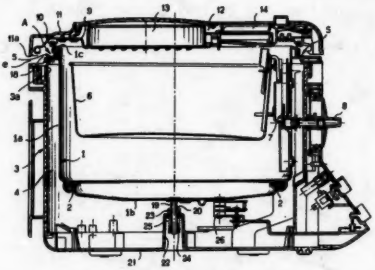
4,995,312

COOKING APPLIANCE WITH ELECTRIC HEATING

Ernest Leiros, Dijon, France, assignor to SEB S.A., Selongey, France

Continuation of Ser. No. 488,504, Mar. 5, 1990, abandoned, which is a continuation of Ser. No. 191,864, May 9, 1988, abandoned. This application Aug. 28, 1990, Ser. No. 574,529
Claims priority, application France, May 13, 1987, 87 06728
Int. Cl.[5] A47J *37/12*
U.S. Cl. 99—411 13 Claims

1. An electrical deep fryer comprising a metal pan (1) having a wall, and an electric heating resister (2) that heats said wall directly by conductive heating to a temperature higher than 150° C., said pan (1) being surrounded by a plastic skirt (3), wherein said skirt (3) is of plastic material which does not continuously withstand a temperature of 150° C., said skirt (3) entirely surrounding the lateral wall (1*a*) and the base (1*b*) of the pan and being separated from said wall and said base by an air space (4) of sufficient width to limit the temperature of the skirt (3) to a value which is compatible with the thermal resistance of the plastic material of the skirt (3), said skirt (3) being completely free with respect to the pan (1) with the exception of a ring (5) which joins only the top edge (3*a*) of the skirt to the top edge (1*c*) of the pan and to which this latter is attached, said ring (5) being of heat-insulating material which is continuously resistant to the temperature of the top edge (1*c*) of the pan (1).

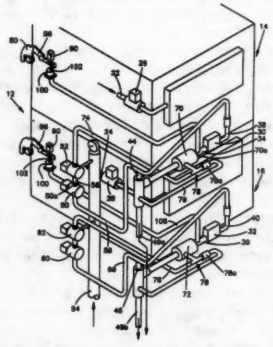


4,995,313

COOKING APPARATUS

William D. Delau, Royalton; James Garman, Wickliffe, and Kevin Keith, Cleveland, all of Ohio, assignors to Welbilt Corporation, New Hyde Park, N.Y.

Filed Mar. 15, 1988, Ser. No. 168,401
Int. Cl.[5] F24D *1/00*; F24N *1/10*; A21B *1/08*; A01J *11/04*
U.S. Cl. 99—467 35 Claims



30. A steam processor capable of operating in convection and pressure modes, comprising:

(a) a housing defining a least 1 closed, insulated cooking chamber for heating food items placed in said chamber by contact with steam, said chamber having a steam inlet and an outlet for discharging steam and condensate;

(b) door means for providing access into the interior of said cooking chamber;

(c) steam control means for controlling the communication of steam from a steam source to the steam inlet;

(d) drain manifold means connecting said steam outlet with an ambient drain;

(e) drain shut-off means disposed in a drain flow path intermediate said steam outlet and said ambient drain;

(f) means for activating said drain shut-off means when a pressure mode of operation is selected by an operator, said drain shut-off means comprising a fluid pressure operated pinch valve including elastomeric member defining a collapsible passageway forming part of said drain and flow path;

(g) a first water control means operative to communicate

water under pressure to said pinch valve when the pressure mode of operation is desired;

(h) steam condensing means including a first water spray nozzle located near said steam outlet and a second water spray nozzle located near an output end of said pinch valve, said first and second nozzles emitting a water mist into said drain manifold means when said cooking chamber is operating in a convection mode;

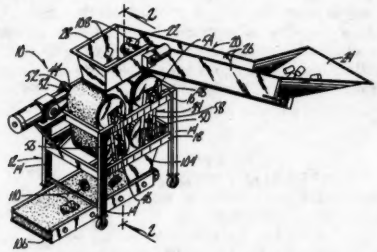
(i) a conduit means for communicating water from said first water control means to said pinch valve, said conduit means further including a restricted bleed passage located near a coupling connecting a conduit segment to said pinch valve, said restricted bleed operative to allow predetermined quantity of water to flow through said coupling when said pinch valve is activated whereby cooling is provided.

4,995,314

CAN FLATTENING MACHINE

Jeffrey J. Buer, Lakewood, Iowa, assignor to Midamerica Recycling Company, Des Moines, Iowa

Filed Oct. 23, 1989, Ser. No. 425,331
Int. Cl.[5] B30B *5/04*
U.S. Cl. 100—152 **6 Claims**



1. A can flattening machine for flattening disposable metal cylindrical beverage cans comprising:

a machine frame having an upper end, and a lower end;

hopper means on said upper end of said frame having an open upper hopper end and an open lower hopper end;

first conveyor means for delivering said beverage cans to said hopper means and for permitting said beverage cans to fall by gravity downwardly through said open lower end of said hopper means;

a can flattening assembly below said hopper means for receiving and flattening said cans after said cans fall from said open lower end of said hopper means;

second conveyor means below said can flattening assembly for carrying said cans from said flattening assembly after being flattened by said flattening assembly;

said flattening assembly comprising a first belt assembly and a second belt assembly, each of which includes an upper roll, a lower roll, and a continuous flattening belt trained around said upper roll and said lower roll, one of said lower rolls being mounted to said frame for movement toward and away from the other said lower rolls; each of said belt assemblies having a spacer frame interconnecting said upper and lower rolls, said spacer frame having a track therein;

bearing means movably mounted within each of said tracks of said spacer frames and being movable within said tracks toward and away from said upper rolls, said lower rolls being rotatably mounted to said bearing means;

first adjustment means interconnecting said bearing means to said frames for permitting selective adjustment of the distance between said upper and lower rolls to adjust the tension in said belts;

a second adjustment means for moving said one lower roll independently of said first adjustment means to selected positions relative to said other lower roll, said second adjustment means including spring means which yieldably holds said one roll against movement away from said other roll, and being capable of yielding in response to a predetermined force to permit said one lower roll to move away from said other lower roll in response to large objects passing therebetween;

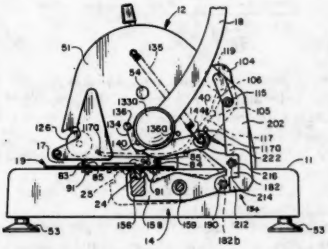
said upper rolls of said first and second belt assemblies being spaced apart from one another and said lower rolls of said first and second belt assemblies being closely adjacent one another so as to create a V-shaped slot between said first and second belt assemblies, said slot being located below said open lower end of said hopper means for receiving said cans therefrom whereby said cans will fall into said V-shaped slot, will be flattened between said lower rolls of said first and second belt assemblies, and will fall to said second conveyor means.

4,995,315

MONEY ORDER IMPRINTER

Robert P. Koper, Bensenville, and Howard R. Konieczka, Chicago, both of Ill., assignors to The Paymaster Corporation, Chicago, Ill.

Filed Oct. 10, 1989, Ser. No. 418,670
Int. Cl.[5] B41J *1/58, 32/00*
U.S. Cl. 101—96 **30 Claims**



1. In an imprinting apparatus for imprinting money orders and like instruments, the combination comprising:

a frame,

a plurality of type segment members supported by said frame and at least certain ones of said type segment members each having first and second sets of printing characters, said type segment members being movable to locate printing characters of said first and second sets on first and second printing lines, respectively,

an inked ribbon and ribbon support means for supporting said ribbon adjacent to printing characters disposed on the first and second printing lines,

platen means supported by said frame and including a first platen adapted for cooperation with printing characters of said first set and a second platen adapted for cooperation with printing characters of said second set,

actuating means supported by said frame and including an operating lever having a normal non-printing position and being movable to a printing position for effecting a printing operation,

means coupled to said operating lever for moving said first and second platens into pressure contact with an instrument disposed between said platen means and printing characters disposed on the printing lines, said means for moving including

a first mechanism coupled to said first platen for moving same into pressure contact with the instrument and printing characters on the first printing line,

and a second mechanism coupled to said second platen and operable independently of said first mechanism to effect impact movement of said second platen into pressure

contact with the instrument and printing characters on the second printing line

and said means for moving said first and second platens being adapted to return said first and second platens to their normal position in the return movement of said operating lever to its normal position.

4,995,316

SCREEN PRINTING MACHINE SQUEEGEE SUPPORT ARRANGEMENT

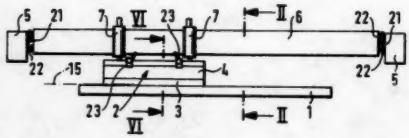
Karl Kölblin, Emmendingen, and Peter Geiger, Teningen, both of Fed. Rep. of Germany, assignors to KG Maschinenfabrik, Fed. Rep. of Germany

Filed Nov. 9, 1988, Ser. No. 268,976

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1987, 3738039

Int. Cl.[5] B41F *15/46*

U.S. Cl. 101—123 **15 Claims**



1. A screen printing machine comprising a printing table;

a support extending transversely of the printing table and guidingly supported at guide rail means disposed at opposite sides of the printing table;

pressure cylinder means connected to and carried by the support;

squeegee holder means carried by the pressure cylinder means for movement therewith,

and pressure control means for controlling pressure applied via the pressure cylinder means to the squeegee holder means during printing operations;

whereby squeegee printing pressures can be controlled independently of the spacing between the support and printing table, wherein the pressure cylinder means includes a plurality of double acting pressure cylinders and associated squeegee holder means spaced along the length of a squeegee means being held thereby; and

wherein the squeegee holder means includes swivel guide means for adjustable pivotally mounting the squeegee means at the pressure cylinder means.

4,995,317

SAFE-AND-ARM DEVICE FOR THE FUZE OF A SPIN-STABILIZED PROJECTILE

Adolf Bankel, Uttenreuth; Hans Strauss, Reichenschwand, and Stephan Kerk, Schnaittach, all of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Fed. Rep. of Germany

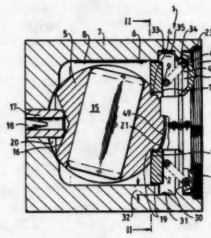
Filed Sep. 15, 1989, Ser. No. 408,140

Claims priority, application Fed. Rep. of Germany, Sep. 20, 1988, 3831863

Int. Cl.[5] F42C *15/26*

U.S. Cl. 102—235 **2 Claims**

1. A safe-and-arm device for a fuze for a spin-stabilized projectile; comprising a supporting housing for said fuze; a spherical rotor being rotatably supported within the supporting housing; a radially groove formed in said supporting housing, said rotor having a bore; a detonator inserted in said bore; an annular groove in a peripheral region of said rotor extending in a pane axially offset relative to said radial groove, a spreadable restraining means inserted in said rotor groove for arming the rotor which is retained in a secured position only after firing of the projectile through the spreadable restraining means which are axially displace and spread apart only subsequent to firing of the projectile responsive to axial and spin fores, and said spreading facilitating pivoting of the rotor with the detonator into the armed position after release thereof, said restraining means comprising a restraining ring; spring means located in said housing for said fuze so as to cause said restraining ring to contact an end surface of the annular groove in said rotor in the secured position of said rotor, said restraining ring



having a plurality of substantially wedge-shaped grooves with radially inwardly extending supporting tongues and supporting surfaces distributed about the circumference thereof, and including an outer ring portion having a slot therethrough and forming a plurality of permanently deformable connectors intermediate said tongues each of similar cross-section, and said restraining ring being maintained between the bottom of the annular groove and the fuze housing under the formation of an inner and an outer annular gap.

4,995,318

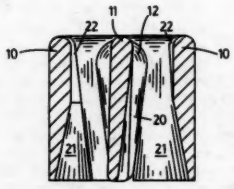
INTERNALLY RIFLED PROJECTILE

Harvey Stidston, and Merritte W. Stidston, both of 1456 Wrenwood, Clovis, Calif. 93612

Filed Apr. 13, 1989, Ser. No. 337,645

Int. Cl.[5] F42B *10/34*

U.S. Cl. 102—503 **7 Claims**



1. An internally rifled projectile comprising a cylindrical annular wing surrounding a teardrop-shaped axial core connected to such annular wing by three helical, canted vanes which run the length of the wing but which core and vanes do not extend beyond the front outer cylindrical surface of the annular wing, such vanes being tapered from front to rear.

4,995,319

SHEAVE TRAIN ASSEMBLY FOR CABLE TRANSPORTATION SYSTEMS

Jean-Francois Mugnier, Grand Junction, Colo., assignor to Poma of America, Inc., Grand Junction, Colo.

Filed Jun. 9, 1989, Ser. No. 364,651

Int. Cl.[5] B61B *7/00, 11/00*

U.S. Cl. 104—112 **16 Claims**

1. A sheave support system for supporting the sheaves of a multiple sheave assembly relative to a support structure such as a ski lift tower and comprising:

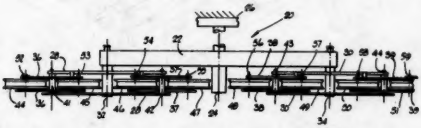
at least two sheave means rotatable mounted on the sheave

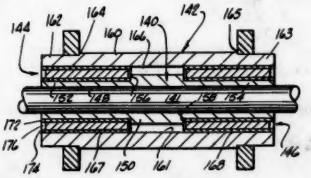
assembly in spaced parallel relationship for supporting the ski lift cable;

at least one main support shaft means for movably supporting the sheave assembly relative to the ski lift tower;

at least two intermediate support arm means mounted on said main support shaft means;

at least two intermediate support shaft means mounted on opposite ends of said intermediate support arm means for rotatably supporting said sheave means;





each of said support shaft means comprising a support shaft, a hub member mounted circumjacent said support shaft, and an elastic bushing means mounted between and circumjacent said support shaft and said hub member for connecting said hub member to said shaft member while enabling limited relative rotative movement therebetween of less than approximately 15° and also limiting transmission of vibration therebetween.

4,995,320

CARRIAGE FOR INSPECTING A PIPING

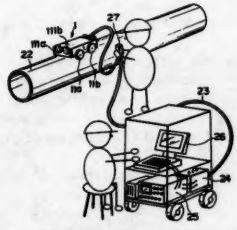
Tomoaki Sato, and Munetake Kondo, both of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Aug. 3, 1989, Ser. No. 389,045

Claims priority, application Japan, Nov. 28, 1988, 63-154386

Int. Cl.[5] B61B *13/04*

U.S. Cl. 104—118 **12 Claims**



1. In a carriage for inspecting an elongated pipe, which carriage is adapted to carry inspection instruments on board and travels on the outer surface of the pipe, the improvement comprising:

support means for carrying said inspection instruments on board the carriage;

a pair of first wheeled travel bodies coupled to said support means, each of said first travel bodies including:

at least two first magnetic wheels which are magnetically attracted to said pipe; and

first driving means for driving said at least two first magnetic wheels;

said at least two first magnetic wheels having a common rotation plane which is parallel with the axial direction of said pipe;

a pair of second wheeled travel bodies coupled to said support means, each of said second travel bodies including:

at least two second magnetic wheels which are magnetically attracted to said pipe; and

second driving means for driving at least two second magnetic wheels;

said at least two second magnetic wheels having a common rotation plane which is substantially perpendicular to the axial direction of said pipe;

elevating means coupled at least to said at least two second magnetic wheels of said second wheeled travel bodies for adjusting a distance between said support means and said wheels to which said elevating means is coupled said elevating means including:

at least one rotatable screw mounted for rotation vertically with respect to said support means;

female threaded members provided in the same number as said rotatable screws and threadably engaged with a respective rotatable screw, said female threaded members being mounted on a respective second wheeled travel body;

said female threaded members being coupled to said wheels for selectively raising and lowering said wheels relative to said at least one adjustable height wheeled body; and

motor means for rotatably driving said rotatable screws for selectively raising and lowering said adjustable height wheeled body relative to a pipe on which said wheels are magnetically mounted; and

means for inclining said at least two first magnetic wheels relative to said support means, thus inclining said common rotation plane of said at least two first magnetic wheels.

4,995,321

CAR BODY FOR RAILWAY ROLLING STOCK

Keiji Ohmura; Sumio Okuno; Michifumi Takeichi; Masato Okazaki, and Hitoshi Tsuruda, all of Kudamatsu, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 13, 1989, Ser. No. 365,439

Claims priority, application Japan, Jun. 13, 1988, 63-143730

Int. Cl.[5] B61D *17/04, 25/00*

U.S. Cl. 105—397 **13 Claims**

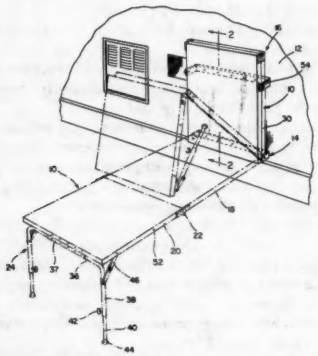
1. A car body for railway rolling stock, the car body comprising a roof means for forming a roof of the car body, a side means for forming respective sides of the car body, end means for forming respective ends of the car body, an underframe means for forming a bottom of the car body, and body bolster means provided on said underframe means and supported by truck means, wherein a shearing rigidity with respect to a vertical load is maximum in a portion of the car body near the body bolster means but slightly displaced in a longitudinal direction of the car body toward a central part of the car body.

4,995,322

EXTERNALLY MOUNTED R.V. TABLE

Percy R. Frederick, 14578 Tulloch Dam Rd., Jamestown, Calif. 95327

Filed Dec. 4, 1986, Ser. No. 938,078
Int. Cl.[5] A47B *23/00*
U.S. Cl. 108—44 6 Claims



1. A table comprising a pair of elongated tabletop panels each having a planar top surface, a hinged connection between adjacent ends of said panels, an adjustable leg assembly supporting an end of one of the tabletop panels remote from the hinged connection and means pivotally connecting an end of the other tabletop panel remote from the hinged connection to a vertical exterior wall of a R.V., and means securing the table in stowed position against the wall of the R.V., said adjustable leg assembly including a generally U-shaped member having an elongated bight portion, a hinged connection between said bight portion and the edge portion of said one tabletop panel remote from the hinged connection between said panels, said U-shaped member having tubular leg portions extending laterally from the ends of the bight portion, each of the leg portions including a telescopically received leg member secured in adjusted position by a setscrew means, and a folding brace interconnecting the leg assembly and said one tabletop panel enabling the leg assembly to be pivoted to a collapsed position underlying said one tabletop panel whereby the adjustable leg members accommodate uneven terrain alongside the R.V.

4,995,323

MODULAR SHELVING AND HANGER BAR SYSTEM

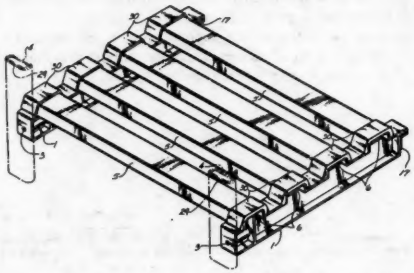
Kenneth K. Kellems, Costa Mesa; William F. Ryczek, Azusa, and Douglas R. Smith, Glendora, all of Calif., assignors to The Stanley Works, New Britain, Conn.

Filed Mar. 2, 1989, Ser. No. 319,428
Int. Cl.[5] A47B *3/06*
U.S. Cl. 108—157 30 Claims

1. A self system comprising:

a pair of horizontal shelf brackets, each bracket comprising a plurality of raised plank securing members spaced apart along its upper face for engaging a plurality of shelf planks and retaining each plank at a selected location spaced apart along the length of the shelf bracket; and

a plurality of elongated shelf planks on top of the shelf brackets, each plank having a cross section transverse to its length complementary to a raised plank securing member on the shelf brackets for elastically engaging the plank



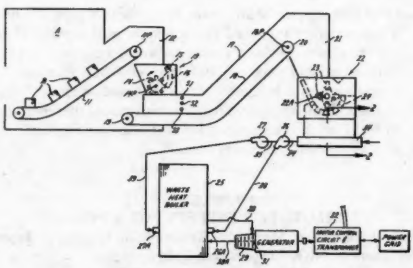
securing member and retaining it on the brackets without additional fasteners.

4,995,324

METHOD OF DISPOSING OF WASTE MATERIAL

Robert M. Williams, 16 La Hacienda, Ladue, Mo. 63124

Filed Jul. 16, 1990, Ser. No. 552,922
Int. Cl.[5] F23B *7/00*
U.S. Cl. 110—234 12 Claims



1. A method of disposing of baled waste material as a fuel in a system of direct firing a boiler having a variable demand for fuel and recovering the heat value thereof as a source of power, the method comprising:

(a.) subjecting stored bales of waste material to a step of breaking up the bales to free the waste material as needed;

(b.) feeding the freed waste material into a live bottom storage unit;

(c.) conveying the freed waste material out of the storage unit at a rate determined by the boiler demand and reducing the waste material to a predetermined particle size;

(d.) direct firing the particles of the waste material in a boiler for reduction to an ash condition while producing steam and;

(e.) utilizing the steam to generate electrical power.

4,995,325

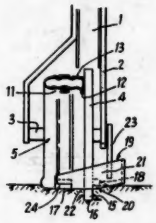
SETTING WHEELS FOR SEED DRILLS

Auguste Herriau, Paris, and Paul Herriau, Cambrai, both of France, assignors to Societe Sogefina, Societe De Gestion Financiere Armoricaine, Paris, France

Filed Feb. 22, 1989, Ser. No. 314,217
Claims priority, application France, Mar. 4, 1988, 88 02755
Int. Cl.[5] A01C *13/00*
U.S. Cl. 111—189 9 Claims

1. A setting wheel assembly for use in a sowing machine, said assembly comprising a setting wheel having a peripheral

portion adapted to urge sown seeds more deeply into a furrow, and a gauging wheel attached to one side of said setting wheel, said gauging wheel having a rolling radius smaller than the radius of said peripheral portion of the setting wheel, wherein said gauging wheel comprises a resiliently deformable ground-engaging surface, said resiliently deformable ground-engaging



surface being a low pressure pneumatic tire, said assembly further comprising a common axle on which said setting wheel and said gauging wheel are independently rotatably mounted, said gauging wheel exerting a tractive force on said setting wheel solely by frictional contact of said ground-engaging surface on said one side of said setting wheel.

4,995,326

ANCHOR WITH CROSS CONNECTION

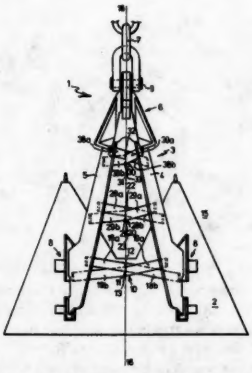
Rob van den Haak, Meerkoetstraat 83a, 2920 AC Krimpen a/d Ijssel, Netherlands

Filed Nov. 30, 1989, Ser. No. 444,743

Claims priority, application Netherlands, Dec. 2, 1988, 8802975

Int. Cl.[5] B63B *21/26*

U.S. Cl. 114—301 **11 Claims**



1. An anchor comprising a fluke and a shank assembly, the latter including at one end, located at the front of said anchor, means for attaching an anchor cable and being joined to said fluke at the other end, said fluke extending along a major plane and said shank assembly comprising two substantially elongated plate-shaped shank members which are joined at said one end and define inbetween a passage for anchor soil, wherein at least one means connecting said two shank members has been arranged in said passage, characterized in that said connecting means (10, 20, 30) each comprise one pair of crossing connecting parts (18, 19; 28, 29; 38, 39), each part extending from the one shank member (4) to the other shank member (5) and comprising two portions (18*a*, 18*b*; 19*a*, 19*b*; 28*a*, 28*b*; 29*a*, 29*b*; 38*a*, 38*b*; 39*a*, 39*b*) arranged on either side of the point (11; 21; 31) where the connecting parts cross.

4,995,327

SEED PLANTING APPARATUS

Walter L. Jeffers, Sr., 1507 Enfinger Rd., Pace, Fla. 32571

Filed Feb. 5, 1990, Ser. No. 475,388

Int. Cl.[5] A01C *7/02*; B67D *5/64*

U.S. Cl. 111—82 **3 Claims**

1. A seed planter apparatus comprising,

a support tray including a plurality of seed storage containers mounted thereto for storage of a variety of selective seeds within the containers, and

a flexible securement means for securement of the tray to an individual, and

a funnel member integrally mounted to the tray defined by a funnel axis, wherein the axis is oriented orthogonally relative to the storage tray, and

an elongate conduit directed downardly from the funnel in an axial alignment and communicating with the funnel, and

wherein the support tray defines a planar support surface including an upstanding perimeter rim extending upwardly of the surface to prevent inadvertent spillage of seeds from the support surface, and the support tray defined by a generally "C" shaped configuration to receive a torso of the individual therewithin, wherein the "C" shaped configuration is defined by spaced legs of the tray, and

wherein the flexible securement means include a first torso strap mounted to exterior surfaces of the legs, wherein the torso strap includes a buckle for adjustment thereof, and the securement means include a flexible neck strap secured adjacent a forward end of the support tray, with a neck strap buckle for adjustment of the neck strap, and

wherein each of the containers is mounted integrally to and extends above support surface of the support tray, and wherein each container includes a flexible cover releasably mounted thereto, wherein the cover includes a lip defining a central opening, wherein the lip restricts loss of seed from a respective container when secured thereto, and

further including a horizontal link integrally and orthogonally mounted to the elongate conduit, and the horizontal link mounted to the elongate conduit at a forward terminal end, and a rear terminal end of the horizontal link mounted medially and integrally to a rear surface of an arcuate concave leg rest.

4,995,328

EDGE TRACING SEWING MACHINE

Takafumi Tanaka, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Filed May 21, 1990, Ser. No. 525,765

Claims priority, application Japan, Jul. 18, 1989, 1-185651

Int. Cl.[5] D05B *3/02*

U.S. Cl. 112—453 **10 Claims**

1. An edge tracing sewing machine comprising:

a reciprocable needle bar having a needle at a lower end thereof;

feeding means for feeding a workpiece in a sewing direction;

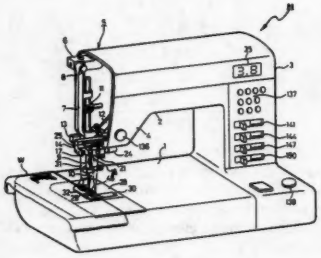
relative position changing means for changing the relative

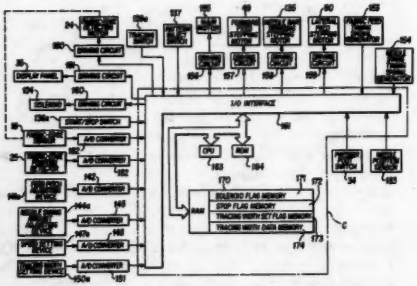
position between the needle and the workpiece in a lateral direction perpendicular to the sewing direction;

edge position detecting means for detecting an edge position of the workpiece in the lateral direction, and generating an edge position signal;

tracing width setting means for setting a tracing width from the edge of the workpiece to the needle in the lateral direction;

control means for controlling said relative position changing means based on the edge position signal generated by said edge position detecting means and the tracing width set by





said tracing width setting means, so as to carry out a tracing sewing with the tracing width;

interruption detecting means for detecting an interruption of the tracing sewing in a vicinity of a corner portion of the workpiece; and

tracing width changing means for changing the tracing width set by said tracing width setting means to a new tracing width corresponding to a distance between the needle and the edge of the workpiece in the lateral direction based on the interruption of the tracing sewing detected by said interruption detecting means.

4,995,329

TIEDOWN DEVICE AND SYSTEM

Larry B. Kleine, 1937 Leicester Way, Fort Collins, Colo. 80526

Filed Aug. 23, 1989, Ser. No. 397,243

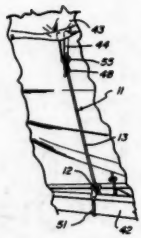
Int. Cl.[5] B63B *17/00*

U.S. Cl. 114—361 **12 Claims**

1. A tiedown device comprising:

a rigid, hook-like end fastening member having a generally bifurcated main body with a bight portion from which extends first and second diverging arm portions and an inturned transverse end portion extending in from said first arm portion and arranged generally at right angles thereto to define a transverse cord retaining surface at one end of said first arm portion opposite said bight portion, and

a flexible cord of a selected length and capable of being stretched along its length, said cord having a first end portion secured to said second arm portion and having an opposite free end portion, said second arm portion of said main body terminating in an eyelet through which the secured end of said cord is passed, said end fastening



member having a rigid, metal inner body and a resilient external surface, said restricted opening being less than the diameter of the cord in an unstretched condition and the cord sliding through said restricted opening when stretched.

4,995,330

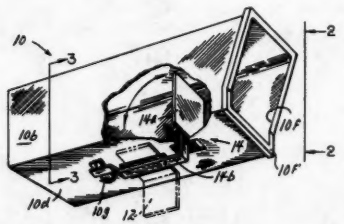
DELIVERY BOX SIGNALING ARRANGEMENT

Billy G. Likens, 5800 Plainview Dr., Evansville, Ind. 47712

Filed Oct. 23, 1989, Ser. No. 425,037

Int. Cl.[5] G09F *17/00*; **B65D** *91/00*

U.S. Cl. 116—175 **4 Claims**



1. A signaling arrangement for a delivery box including a bottom wall comprising a control plate assembly pivotably mounted within said delivery box and operatively responsive to the placement of an article into said box, where said control plate assembly includes a strip having a forward portion within said box and a rearwardly extending portion below said bottom wall of said box, where said forward portion and said rearwardly extending portion of said strip are selectively vertical with respect to said bottom wall of said box, where a free rear end of said rearwardly extending portion of said strip selectively cooperates with securing means on said bottom wall of said box and releasably maintains said control plate assembly at a predelivery location, where placement of said article releases said free rear end and causes said strip to pivot from an article blocking position to a signaling position, where a control plate is mounted on said strip within said box in a blocking relationship with said article, and where a signal plate is mounted on said rearwardly extending portion of said strip below said box and between said rear free end and said forward portion thereof.

4,995,331
APPARATUS FOR GLAZING ARTICLES OF EARTHENWARE OR PORCELAIN

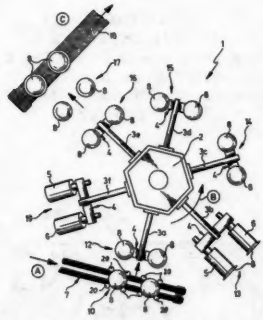
Karl Voit, Weissenstadt, Fed. Rep. of Germany, assignor to Michael Voit, GmbH, Weissenstadt, Fed. Rep. of Germany

Filed Apr. 26, 1989, Ser. No. 344,353

Claims priority, application Fed. Rep. of Germany, May 9, 1988, 3815822

Int. Cl.[5] B05C *3/10, 13/00*

U.S. Cl. 118—46 **19 Claims**



1. Apparatus for glazing an article, comprising:

a rotating support means for glazing the article in a glazing station and transporting the article in a working cycle from said glazing station to a discharge station from which the finished article is transported away for further processing, said support means including a capstan, at least one supporting arm defining an axis and having one end connected to said capstan, a workpiece holder mounted to the other end of said arm, and at least one glaze vessel defining an axis of rotation and mounted to said workpiece holder;

centering means provided in a centering station for centering the article in alignment with a first suction means by which the article is transferred from said centering station to said glaze vessel;

means for rotating said glaze vessel about said axis of rotation;

means for tilting said glaze vessel relative to said axis of said supporting arm; and

means for holding the article on said glaze vessel.

4,995,332
APPARATUS FOR STOCKING GOLF CLUBS

Shigeyoshi Tsuruoka, and Saigiro Hayashi, both of Chiba, Japan, assignors to Hoyu Bussan Kabushiki Kaisha, Chiba, Japan

Continuation-in-part of Ser. No. 316,225, Feb. 27, 1989, abandoned. This application Jun. 7, 1989, Ser. No. 362,683

Int. Cl.[5] B05B *15/12;* **A63B** *57/00;* **A46B** *13/04;* **B65G** *29/00*

U.S. Cl. 118—66 **22 Claims**

1. An apparatus for cleaning, waxing and stocking a plurality of golf clubs, comprising:

(a) an apparatus floor;

(b) a turn table supporting member which is substantially of a disc shaped metal located above said floor of the apparatus via legs;

(c) a turn table rotatably supported on the turn table supporting member;

(d) means for cleaning and waxing golf clubs wherein said means has a club output port, a golf club transport mechanism, a golf club cleaning portion, a golf club waxing portion, and a grip drying portion;

(e) a plurality of golf club housings removably attached onto the turn table, each having a club introducing inlet in radial directions of the turn table with equal angles of intervals with respect to the turn table for housing respective golf clubs delivered from the club output port of the golf club cleaning and waxing means;

(f) a turn table drive mechanism for turning the turn table so that any one of the golf club introducing inlets is communicated with the club output port of the club cleaning and waxing means to receive one of the golf clubs delivered through the output port; and

(g) means for delivering the cleaned and waxed golf clubs from the output port to the club introducing inlet of said housing.

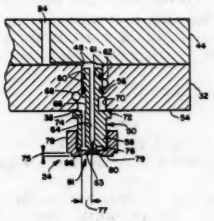
4,995,333
SPRAYED ADHESIVE SYSTEM FOR APPLYING A CONTINUOUS FILAMENT OF THERMOPLASTIC MATERIAL AND IMPARTING A SWIRLING MOTION THERETO

Richard F. Keller, Fremont; Terry L. Springer, Menasha, and Jeffrey J. Jeanquart, Neenah, all of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Sep. 15, 1989, Ser. No. 408,019

Int. Cl.[5] B05B *7/00;* **B05C** *5/00*

U.S. Cl. 118—300 **34 Claims**



1. An apparatus for forming a substantially continuous filament of a thermoplastic work material and imparting a swirling motion thereto, comprising:

a body member which has a work material supply passage and a gas supply passage formed therein, said gas supply passage substantially aligned with and generally radially spaced from a longitudinal central axis of said body member, and said gas supply passage having substantially no inclination along a radial direction toward said central axis of said body member;

an outlet nozzle section which is connected to said body member and has a substantially conically tapered shape, said nozzle section having a nozzle extrusion passage formed therein in communication with said work material supply passage; and

a housing member which operably connects to said body member to delimit a substantially annular gas transfer zone in fluid communication with said gas supply passage and to delimit a substantially annular gas outlet passage around said nozzle section and in fluid communication with said gas transfer zone, said housing member including an exit section having inner wall surfaces which substantially parallel the substantially conically tapered shape of said nozzle section, and which are in a selected spaced relation from said nozzle section to define said gas outlet passage, said gas supply passage, said housing exit section and said nozzle section configured to provide for a selected gas flow which imparts said filament swirling motion substantially without disintegrating said filament, said apparatus thereby constructed to deposit a substantially continuous, swirled filament of said work material onto a selected substrate.

4,995,334

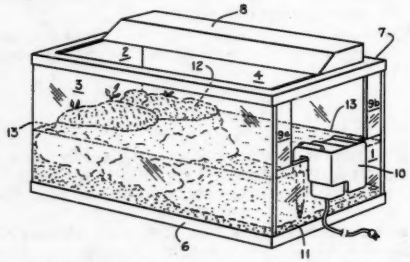
AQUARIUM-TERRARIUM TANK

Lawrence I. Wechsler, 1 Wooleys La., Great Neck, N.Y. 11023

Continuation of Ser. No. 279,915, Dec. 5, 1988, abandoned. This application May 8, 1990, Ser. No. 520,845

Int. Cl.[5] A01K *63/00*

U.S. Cl. 119—5 4 Claims



1. An aquarium tank having a bottom wall peripherally bounded by vertical side walls, each vertical side wall having a top edge, at least one of the vertical peripheral side walls being at least partially shorter in height than the other side walls, for holding water at a level below the top edge of said at least partially shorter peripheral side wall, and a hanging filter mounted on the top edge of said at least partially shorter peripheral side wall having a water intake extending downwardly therefrom to withdraw water from the interior of the tank.

4,995,335

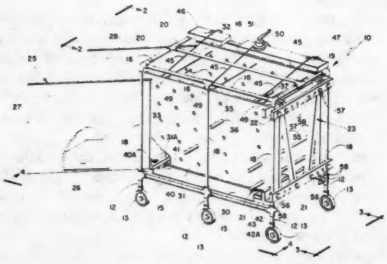
ANIMAL RESTRAINT CAGE

John H. Wright, 6608 Flying Cloud Dr., Eden Prairie, Minn. 55344

Filed Sep. 10, 1990, Ser. No. 579,890

Int. Cl.[5] A01K *1/06*

U.S. Cl. 119—98 5 Claims



1. In an animal restraint means comprising in combination, frame means defining a generally rectangular parallelepipedon and having an elevated base platform plane, a top plane, opposed side planes and opposed end planes, an open animal access port arranged at one end and a stanchion securing means disposed at the opposed end thereof, said animal restraint means being characterized in that:

(a) ramp receiving means removably positioned between the ground and said base platform plane at said access end for elevating an animal accessing said animal restraint means;

(b) side wall plates removably positioned between said side planes and having axially aligned pairs of bores formed therein for releasably receiving restraint rods therewithin for restraining upward movement of an animal positioned within said animal restraint means;

(c) looking means disposed generally along said base platform plane and secured to said frame means for receiving the base edge surfaces of each of said side wall plates within said frame means in predetermined spaced-apart relationship, and means for snugging and releasably securing the upper edge surface of each of said side wall plates in position about the opposed sides within said animal restraint means; and

(d) said stanchion securing means comprising a pair of laterally spaced-apart rod members and having locking means for releasably securing said rods to said frame means for the adjustable positioning of said rods to form said stanchion means.

4,995,336

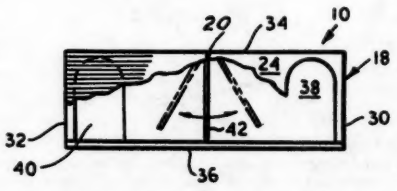
ANIMAL ENTRANCE

Mary M. Deemer, 106 E. Seventh St., and Lois K. Kugler, 606 North St., both of Oil City, Pa. 16301

Filed Apr. 25, 1990, Ser. No. 514,205

Int. Cl.[5] E05B *65/00*

U.S. Cl. 119—15 4 Claims



1. An animal entrance adapted to be received in a window opening of an open window in a wall having a double hung window comprising an elongated enclosure;

said elongated enclosure defined by a front wall, a rear wall spaced from said front wall, a top, a bottom, a first closed end and a second closed end;

a first door opening in said front wall adjacent said first closed end and;

a second door opening in said rear wall adjacent said second closed end defining a passage in said elongated enclosure between said first door opening and said second door opening; and

a swinging door in said elongated enclosure disposed generally perpendicular to said front wall and to said rear wall between said first door opening and said second door opening;

said swinging door being swingably supported on said elongated enclosure by hinge means;

said swinging door being urged toward a closed position by gravity whereby an animal can enter said first door opening, pass through said swinging door and exit said second door opening and thereby enter into or exit from one side of said elongated enclosure to the other.

4,995,337

CAGE FEEDER WITH NOVEL CAGE ATTACHMENT MEANS

Lionel Abrams, 10 Dawes Road, Toronto, Ontario, Canada (M4C 5A7); Arthur Fisher, and Ronald F. Jameson, both of Markham, Canada, assignors to Lionel Abrams, Toronto, Canada

Filed Mar. 6, 1990, Ser. No. 488,882

Int. Cl.[5] A01K *39/01*

U.S. Cl. 119—18 9 Claims

1. A small animal cage feeder comprising:

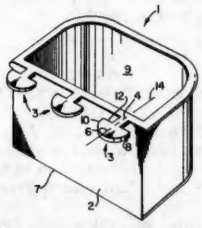
a feed holding means;

at least one resilient protrusion extending from said feed holding means comprising a neck joined at one end to said feed holding means and terminating at its other end in the base of an enlarged head, said head enlarged transversely

of said neck so as to have a greater extent from side to side than the distance between adjacent horizontally spaced vertical bars in a vertical bar cage with which the cage feeder is intended to be used and so that the distance, transversely of said neck, between one side of said neck and the more distal side of said head is greater than the distance between adjacent vertically spaced horizontal bars in a horizontal bar cage with which the cage feeder is intended to be used;

said neck having a resilient limit and said head being turnable about a central longitudinal axis of said neck so as to enable one to twist said neck beyond its resilient limit in order to reorientate said head with respect to said feed holding means;

whereby, in a vertical bar animal cage, the enlarged head of said at least one protrusion may be deflected to snap be-



tween adjacent horizontally spaced vertical bars so that such bars are positioned on either side of the neck of said at least one protrusion and are sandwiched between the base of the enlarged head and the feed holding means and thereafter the animal cage feeder may be lowered so that said neck rests on a horizontal support bar of the cage;

and whereby, in a horizontal bar animal cage, said at least one protrusion may be inserted between two vertically spaced horizontal bars an rested upon the lower of the two horizontal bars and the enlarged head turned about said axis of said neck to twist said neck beyond its resilient limit so that said head has a new orientation which is such that said two horizontal bars are positioned on either side of the neck of said at least one protrusion and are sandwiched between the base of the enlarged head and the feed holding means.

4,995,338

COATING APPARATUS

Hirobumi Morita; Eiichi Matsuzaki; Yukio Chiba, and Shigeo Kato, all of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 22, 1988, Ser. No. 247,853

Claims priority, application Japan, Sep. 24, 1987, 62-241997; Nov. 18, 1987, 62-175035[U]

Int. Cl.[5] B05C *1/04*

U.S. Cl. 118—410 **19 Claims**

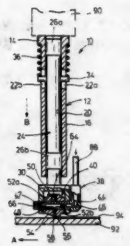
1. A coating apparatus for coating an object with a coating material in a coating direction, comprising:

a holder adapted to be mounted on a controllable support member;

a shaft slidably supported in said holder;

a head member mounted on said shaft for angular movement with respect to said shaft, said head member having sliding surfaces for slidably contact with an object and a coating material outlet positioned forwardly of said sliding surface in the coating direction; and

a recess defined between said sliding surfaces in fluid communication with said coating material outlet, said recess having a substantial width in a direction transverse to the coating direction and a greater widthwise dimension than said coating material outlet, wherein said coating material



is uniformly applied to said object according to dimensions of said recess.

4,995,339

COATING APPARATUS

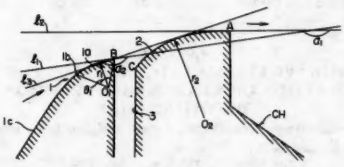
Seiichi Tobisawa, Hachioji; Takemasa Namiki, Iruma, and Shigetoshi Kawabe, Hachioji, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Feb. 16, 1989, Ser. No. 311,250

Claims priority, application Japan, Feb. 17, 1988, 63-34859; Mar. 4, 1988, 63-50695

Int. Cl.[5] B05C *3/12, 5/00*

U.S. Cl. 118—410 **8 Claims**



1. An apparatus for coating a flexible support with a coating solution from a supply thereof comprising:

a coating head having a coating surface including an upstream side and a downstream side;

means for moving the support along the coating surface, the coating surface defining a front face disposed on the upstream side of the coating surface and a back face disposed on the downstream side of the coating surface;

a slit in the coating surface between the front and back faces, the slit being in communication with the supply of the coating solution, for extruding the coating solution through the slit onto the flexible support as the support moves along the coating surface from the front face to the back face;

the front face including an introducing segment, a turning portion and an end section, wherein the end section has a radius of curvature r_1;

the back face including an arcuate surface having radius of curvature r_2 along its entirety, the radii of curvature being related according to the relationships;

$1\ mm < r_1 < r_2/2$

$3\ mm < r_2 < 20\ mm$; and

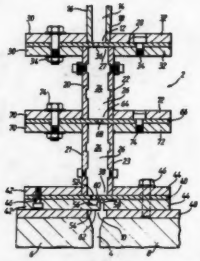
the end section having a downstream end and at least a art of the back face extending beyond a line tangent to the downstream end of the front face.

4,995,340

GLASS COATING APPARATUS

David Martlew, Merseyside, and Malcom J. Rigby, Lancashire, both of England, assignors to Pilkington PLC, Merseyside, England

Filed Oct. 12, 1989, Ser. No. 420,381
Claims priority, application United Kingdom, Oct. 14, 1988, 8824103
Int. Cl.[5] B05C 3/02
U.S. Cl. 118—715 10 Claims



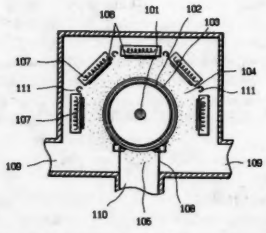
1. Apparatus for coating flat glass by directing a reactant gas over the glass surface, the apparatus incorporating a gas flow restrictor having an inlet and an outlet, which gas flow restrictor comprises a chamber which is adapted to receive a supply of reactant gas and is adapted to output a flow of the reactant gas over the flat glass being coated, a series of at least two restrictions, each restriction comprising a plate member extending across the chamber and having a plurality of apertures therethrough, and a gas flow deflector at the outlet of the restrictor for deflecting the gas flow from the outlet and preventing the gas flow from impinging directly on the glass.

4,995,341

MICROWAVE PLASMA CVD APPARATUS FOR THE FORMATION OF A LARGE-AREA FUNCTIONAL DEPOSITED FILM

Jinsho Matsuyama, Nagahama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 21, 1989, Ser. No. 439,817
Claims priority, application Japan, Nov. 24, 1988, 63-294740
Int. Cl.[5] C23C 16/48
U.S. Cl. 118—723 2 Claims



1. A microwave plasma chemical vapor deposition apparatus for continuously forming a functional deposited film on a substrate, comprising (a) a substantially enclosed film forming chamber containing means for holding said substrate, said film forming chamber including (b) means for feeding a film-forming raw material gas into a film forming space contained within said film forming chamber, (c) means for evacuating said film forming space, (d) a microwave introducing window means connected to a microwave power source; (e) an etching chamber for cleaning said microwave introducing window with an etching gas; said etching chamber including (f) an etching space, (g) means for feeding an etching raw material gas into said etching space, and (h) means for applying an activation energy into said etching space to excite said etching raw material gas to convert it into said etching gas, wherein said microwave introducing window means comprises:

(i) at least one fixed cylindrical microwave transmitting window;

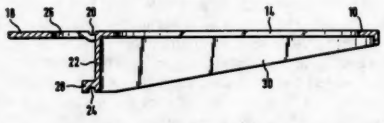
(ii) a movable cylindrical microwave transmitting window concentrically disposed about said at least one fixed window; means for rotating said movable cylindrical microwave transmitting window between the film forming chamber and the etching chamber, whereby a portion of the movable microwave transmitting window is cleaned in the etching chamber by etching off any film deposited on said movable microwave transmitting window with the etching gas in the etching chamber and a second etched portion of said movable microwave transmitting window is rotated to a position in the film forming chamber from said etching chamber.

4,995,342

HOLDER FOR BIRD FOOD PACKED IN PORTION CONTAINERS

Michael Hinrichs, Kirchlinteln-Luttum; Jurgen Homolla, Minden; Eckart Schormair, Otersen; Klaus Czempik, Verden, and Rolf Hornig, Kirchlinteln-Luttum, all of Fed. Rep. of Germany, assignors to EFFEM GmbH, Verden, Fed. Rep. of Germany

Filed Mar. 26, 1990, Ser. No. 499,088
Claims priority, application Fed. Rep. of Germany, Apr. 1, 1989, 8903972[U]; Sep. 14, 1989, 8911093[U]
Int. Cl.[5] A01K 5/01
U.S. Cl. 119—18 19 Claims



1. A holder for bird food packed in portion containers comprising a reception portion extending horizontally when in use and having an opening forming a receptacle for a bird food portion container, a gripping portion connected thereto and a first notch between said reception portion and said gripping portion extending at right angles thereto, an end flange fixed at right angles to said reception portion adjacent said notch provided at its end remote from said reception portion with a second notch oriented vertically with respect to said first notch during use.

4,995,343

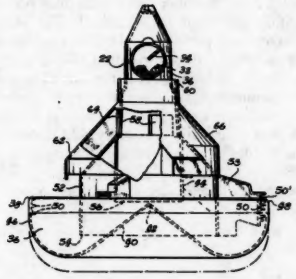
FEEDER APPARATUS

Theodore J. Cole, and Ray E. Swartzendruber, both of Syracuse, Ind., assignors to CTB, Inc., Milford, Ind.

Filed Jan. 26, 1989, Ser. No. 302,015
Int. Cl.[5] A01K 39/012
U.S. Cl. 119—53 11 Claims

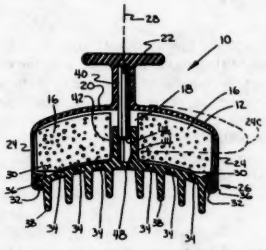
1. A feeder for poultry and other domestic birds and animals comprising, a pan member for containing and presenting feed for consumption, feeder tube means disposed above said pan member and connectible with a feed conveyor source, said feeder tube means having upper and lower feed gates for directing feed supplied from said feed conveyor source into said pan member, and rotatable collar means surrounding said feeder tube means for controlling a first feed flow directed through said upper feed gate into the pan member independently of a second feed flow directed through said lower feed

gate into said pan member, said rotatable collar means independently controlling said first feed flow when said feeder, includ-



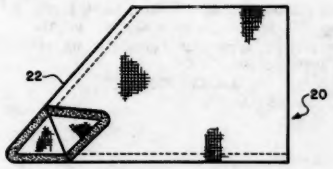
ing said pan member, is resting on a feeding surface and when said feeder is elevated above said feeding surface.

4,995,344
APPARATUS FOR CLEANING WITH AQUEOUS SOLUTION
Anita D. Olson, 3106 Hwy 169 So., Grand Rapids, Minn. 55744
Filed Nov. 22, 1989, Ser. No. 440,520
Int. Cl.[5] A01K *13/00*; A46B *11/04*
U.S. Cl. 119—85 **9 Claims**



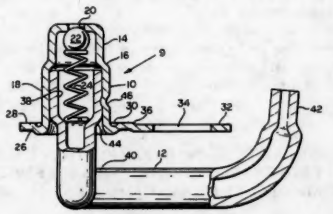
1. A manual scrubbing device comprising
(a) a cover member having an imperforate top member and a handle extending upward from the top member;
(b) a scrub member having downward facing scrubbing means for contacting and scrubbing the hair and skin of a mammal, and a resiliently pliable perforate platen to which said scrubbing means is secured, said platen being positioned between said cover and said scrubbing means;
(c) a resiliently collapsible tubular section connecting a perimeter of the platen to a perimeter of the top member;
(d) compound holding means between said top member and said platen and within said tubular section for holding an aqueous soluable scrubbing compound;
(e) platen moving means operatively connected between a center of said top member and a center of said platen for enabling repetitive movement of the perforate platen toward and away from the top member and for transversely driving said platen in a scrubbing motion, in response to forces manually applied upon the handle; and in which
(f) said platen moving means includes a strut which is normal to the platen and a socket slip fitted on the strut, said strut being fixed in one of the cover member or the platen.

4,995,345
DE-LOUSING BAG FOR PETS
Hilda G. Friedman, 637 S. DePeyster St., Kent, Ohio 44240
Filed Dec. 11, 1989, Ser. No. 448,350
Int. Cl.[5] A01K *13/00*
U.S. Cl. 119—160 **2 Claims**



1. An animal delousing container comprising:
a tube section, having an angularly disposed forward end, rearward end, top side and bottom side and closed on all sides and ends, except for a closeable opening provided on the forward end and bottom side, said closeable opening operating as the means for the introduction of an animal into said tube section, said animal being introduced into said tube section such that the animal's head is adjacent to said top side thereby providing the animal more room at the bottom end thereof for movement, said tube section separating into a hollow body upon the introduction of said animal into said tube section, said closure opening means further operating as the means for the introduction of pest insecticides into said hollow body, said closeable opening operating to close said hollow body to the extent that the animal's body, excepting the head portion, is completely encapsulated thereby containing said pest insecticide within the proximity of the animal's body for greater effectiveness in eradicating said pests.

4,995,346
OIL JET PISTON COOLER
Sharon J. Hudson, Jr., Lambertville, Mich., assignor to Sharon Manufacturing Company, Lambertville, Mich.
Filed Jun. 28, 1989, Ser. No. 372,322
Int. Cl.[5] F01P *1/04*
U.S. Cl. 123—41.35 **15 Claims**



1. An improved oil jet piston cooling device for directing a stream of oil upwardly towards the inside of a reciprocable piston of an internal combustion engine, said device comprising: a body member having an upstream cylindrical end section defining a first upstream portion of an entrance chamber, said body member having a valve aperture and a surrounding seat on its upstream end, a spout member having an upstream cylindrical end section defining a second portion of said entrance chamber, said upstream end of said spout member being tightly fitted inside said body member and coaxially aligned with said upstream end of said body member, said spout member also having an intermediate section followed by a nozzle section on its downstream end, and a pressure responsive valve mechanism contained in said entrance chamber.

4,995,347

INTAKE DEVICE OF A TWO STROKE ENGINE WITH SUPERCHARGER BYPASS PASSAGE

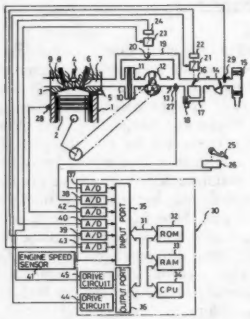
Takao Tate, Susono; Norihiko Nakamura, Mishima; Hiroshi Noguchi, Gotemba; Michio Kawagoe, Susono; Toyokazu Baika, Susono; Kichiro Kato, Susono; Yoshio Kido, Gotemba; Katsuhiko Hirose, Susono; Hiroaki Nihei, Susono, and Masahiko Masubuchi, Susono, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Nov. 30, 1989, Ser. No. 443,314

Claims priority, application Japan, Dec. 6, 1988, 63-306807; Mar. 8, 1989, 1-53680

Int. Cl.[5] F02B *75/02*

U.S. Cl. 123—65 BA **37 Claims**



1. An intake device of a two stroke engine; comprising:

an intake passage having a throttle valve therein;

a mechanically driven supercharger driven by the engine and arranged in said intake passage downstream of said throttle valve;

a bypass air passage branched from said intake passage between said throttle valve and said supercharger and connected to said intake passage downstream of said supercharger;

a bypass air control valve arranged in said bypass air passage;

detecting means for detecting a level of vacuum in said intake passage between said throttle valve and said supercharger and producing an output signal representing said level of vacuum; and

bypass control means for controlling a degree of opening of said bypass air control valve in response to the output signal of said detecting means to bring said level of vacuum to a predetermined level when the engine is idling.

4,995,348

TWO-STROKE INTERNAL COMBUSTION ENGINES AND PROCESS FOR OPERATING SAID ENGINES

Jean F. Melchior, 126Bld du Montparnasse, 75 014 Paris, France

Continuation of Ser. No. 67,918, Aug. 3, 1987, abandoned. This application Jul. 7, 1989, Ser. No. 376,146

Claims priority, application France, Nov. 6, 1985, 85 16430

Int. Cl.[5] F02B *75/02*

U.S. Cl. 123—65 VD **58 Claims**

1. An internal combustion engine operating on a two-stroke cycle comprising:

at least one work chamber including a cylinder and a reciprocating piston in said cylinder, said work chamber having a predetermined compression ratio;

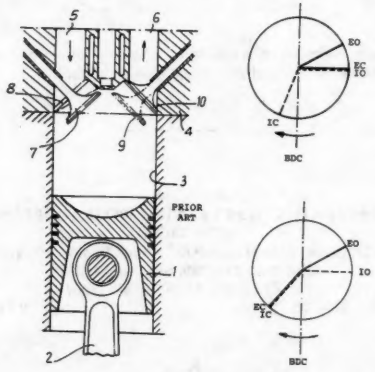
an engine shaft which rotates in synchronization with the movement of said piston and defining an angular position of a cycle of operation of said work chamber;

an intake means for allowing the introduction of fresh air into said work chamber when in an open position and for preventing any fluid flow through said intake means when in a closed position, said intake means operating in synchronization with the rotation of said engine shaft;

an exhaust means for allowing the removal of exhaust gases from said work chamber when in an open position and for preventing any fluid flow through said exhaust means when in a closed position, said exhaust means operating in synchronization with the rotation of said engine shaft;

a supercharger including (a) a turbine having a gas inlet which communicates with the exhaust gases from said work chamber to drive said turbine, and (b) a compressor which is mechanically driven by said turbine and which has an air outlet which communicates with said intake means;

a sensing means for sensing at least one power-dependent parameter of the engine during operation and for determining when the engine is operating at one of start up and low power in contrast to a normal operation; and



a control means for controlling a normal opening of said intake means and of said exhaust means as a function of the angular position of said rotating engine shaft during the normal operation of the engine, said control means further being responsive to the sensing of said sensing means of the start up or low power operation of the engine to advance a beginning of the opening of said intake means relative to a beginning of opening of said intake means during normal operation while maintaining the opening of said intake means subsequent to a beginning of the opening of said exhaust means whereby a sufficient quantity of fresh air is supplied by said supercharger to said intake means during all operations.

4,995,349

STRATIFIED AIR SCAVENGING IN TWO-STROKE ENGINE

Charles H. Tuckey, Cass City, Mich., assignor to Walbro Corporation, Cass City, Mich.

Continuation-in-part of Ser. No. 153,204, Feb. 8, 1988, abandoned. This application Aug. 7, 1989, Ser. No. 390,540

Int. Cl.[5] F02B *75/02*

U.S. Cl. 123—65 VB **4 Claims**

1. In a two-cycle engine having a cylinder, a cylinder head having a fuel and air inlet port, a cylinder wall, a piston in said cylinder, a spark plug in said cylinder head, and a crankcase,

(a) a unidirectional air inlet into the crankcase,

(b) a transfer passage for air from the crankcase to said inlet port in said cylinder head,

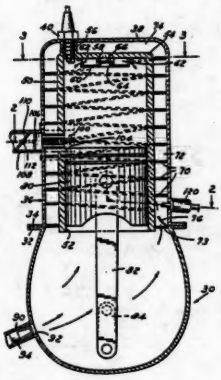
(c) a unidirectional valve between the crankcase and said transfer passage, allowing flow from the crankcase to said passage,

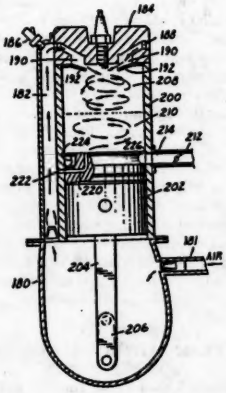
(d) said transfer passage being adapted to carry fuel and air to said cylinder head,

(e) a valve positioned in said fuel and air inlet port operable to close during the compression phase of said cylinder,

(f) means associated with said inlet port in said cylinder head to impart a swirling motion to air and a fuel-air mixture passing through said inlet port into said cylinder to create a stratification of residual exhaust gases, air, and a fuel-air mixture,

(g) an exhaust passage in said cylinder wall,





(h) a throttle means in said exhaust passage to control directly the outlet of exhaust gases and indirectly the quantity of air and fuel-air mixture entering the cylinder, and

(i) said piston in said cylinder having an annular groove around the circumference directly adjacent the top of the cylinder positioned to register with said exhaust passage when said piston is in the bottom dead center position, the top of the piston at the top of said annular groove having a diameter slightly less than the inner diameter of the cylinder to allow exhaust gases to pass into said groove as the piston descends to the bottom position.

4,995,350

2-CYCLE UNI-FLOW SPARK-IGNITION ENGINE

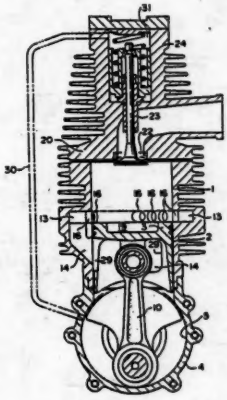
Seiichiro Kumagai, Tokyo; Michikata Kono, Hachioji; Masakazu Okai, Kanagawa, and Hisashi Inaga, Tokyo, all of Japan, assignors to Kioritz Corporation, Tokyo, Japan

Filed Sep. 12, 1989, Ser. No. 406,386

Claims priority, application Japan, Oct. 17, 1988, 63-261125

Int. Cl.[5] F02B *75/02*

U.S. Cl. 123—65 VC **2 Claims**



1. A 2-cycle uni-flow spark-ignition engine comprising:

at least one cylinder defining therein a cylinder chamber;

a piston reciprocatively received in said cylinder;

a crank case defining therein a crank chamber;

a scavenging system including an annular scavenging chamber provided on said cylinder along the inner periphery of said cylinder over the entire circumference of said cylinder, a plurality of scavenging ports provided in the wall of said cylinder so as to be opened to said cylinder chamber at the end period of the downward stroking of said piston and communicating with said annular scavenging chamber, and scavenging passages means for communicating said annular scavenging chamber with said crank chamber, so that the fluid introduced into said crank chamber is pressurized by the downward stroking of said piston so as to accumulate a pressure in said annular scavenging chamber through said scavenging passages means and is supplied through said scavenging ports into said cylinder chamber so as to form a scavenging uni-flow with a swirl in said cylinder chamber;

a spark plug provided on said cylinder so as to confront said cylinder chamber; and

an exhaust valve provided on the top of the cylinder and normally opened by being driven with a predetermined force exerted by driving coiled spring means (24) towards the inside of said cylinder chamber;

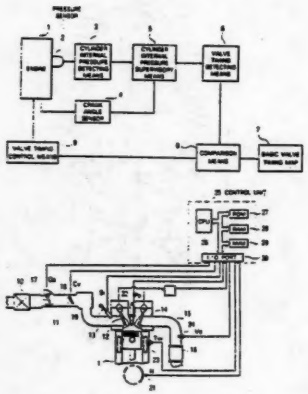
whereby said exhaust valve is closed in the beginning period of compressing upward stroking of said piston so as to allow compression of the mixture introduced into said cylinder chamber and is automatically opened at an end period of expansion downward stroking of said piston after explosion and generation of power so as to enable the combustion gas to be discharged as exhaust gas.

4,995,351

VALVE TIMING CONTROL APPARATUS FOR AN INTERNAL COMBUSTION ENGINE

Satoru Ohkubo, Amagasaki, and Akira Demizu, Himeji, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 1, 1990, Ser. No. 561,022
Claims priority, application Japan, Nov. 21, 1989, 1-304259
Int. Cl.[5] F01L *9/04, 1/34*
U.S. Cl. 123—90.11 2 Claims



1. A valve timing control apparatus for an internal combustion engine equipped with an intake valve and exhaust valve, said valve timing control apparatus comprising:

a pressure sensor for sensing the internal pressure in an engine cylinder;

a crank angle sensor for sensing the crank angle of the engine;

valve timing detecting means for detecting the opening and closing timings of the intake and exhaust valves from the sensed cylinder internal pressure and the sensed engine crank angle;

disabling means for disabling the operation of said valve timing detecting means during combustion periods of the engine;

valve timing storage means for storing basic valve opening and closing timings for the intake and exhaust valves which are predetermined based on the operating conditions of the engine;

comparison means for comparing the detected valve opening and closing timings as detected by said valve timing detecting means and the predetermined valve opening and closing timings stored in said valve timing storage means so as to calvulate deviations therebetween; and

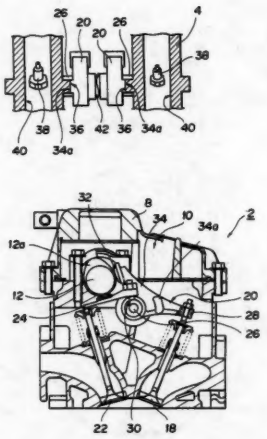
valve timing control means for controlling the opening and closing timings of the intake and exhaust valves in accordance with the deviations thus calculated in such a manner that the actual opening and closing of the intake and exhaust valves take place at the predetermined basic valve opening and closing timings.

4,995,352

DYNAMIC VALVE MECHANISM OF INTERNAL COMBUSTION ENGINE

Atsumi Machino, Shizuoka, Japan, assignor to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed Apr. 13, 1990, Ser. No. 509,335
Claims priority, application Japan, Apr. 28, 1989, 1-110720
Int. Cl.[5] F01L *1/18*
U.S. Cl. 123—90.39 3 Claims



1. A dynamic valve mechanism in an internal combustion engine including a rocker shaft mounted on a cylinder head, a cam shaft rotatably mounted on the cylinder head and disposed in generally parallel relationship to the rocker shaft, the cam shaft having a cam thereon, a rocker arm swingably supported on the rocker shaft and having a first arm projecting radially therefrom for engagement with the cam and a second arm projecting radially therefrom for engagement with the stem of a valve projecting through the cylinder head, the improvement comprising a positioning portion fixedly and integrally joined to one arm of said rocker arm and projecting sidewardly thereof along a direction which is generally parallel with the axial direction of said rocker shaft, said positioning portion terminating in an axial free end defined by an axially facing abutment surface, and a holding portion fixed to said cylinder head and projecting axially toward said positioning portion and terminating in an axial free end which defines thereon a contact surface which is abutted against said abutment surface.

4,995,353

VALVE TRAIN WITH LASH/COMPLIANCE COMPENSATION

George T. Stegeman, Union Lake; Tony H. Zarger, Rochester, and Robert J. Outland, Grosse Pointe Woods, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 11, 1990, Ser. No. 508,072
Int. Cl.[5] F01L *1/14, 1/24, 1/08*
U.S. Cl. 123—90.48 12 Claims

1. A valve train for an internal combustion engine, said valve train comprising;

a poppet valve reciprocably movable to open and closed positions,

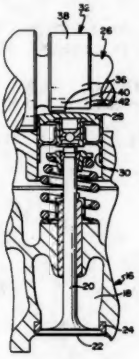
a valve spring urging the valve toward its closed position with a predetermined seating force,

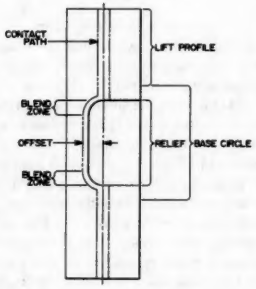
a rotatable cam for causing controlled opening and closing of the valve against the force of the valve spring,

actuator means operable by the cam for activating the valve, the actuator means including a cam follower having a

crowned surface in contact with the cam, the crowned surface including a crest,

and the cam having a lift profile operative to open and close the valve as it passes over the cam follower, a base circle portion shaped to contact the crest of the crowned surface in first regions adjacent the lift profile and to contact the





crowned surface at a distance offset from the crest in a second region opposite the lift profile, the base circle portion being operative to compress the actuator means to near the point of valve opening when the base circle contacts the crest and to unload the actuator means when the base circle contacts the crowned surface at a distance offset from the crest.

4,995,354

TWO-CYCLE ENGINE

Koji Morikawa, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 13, 1989, Ser. No. 449,816

Claims priority, application Japan, Dec. 21, 1988, 63-324665

Int. Cl.[5] F02B *75/02*

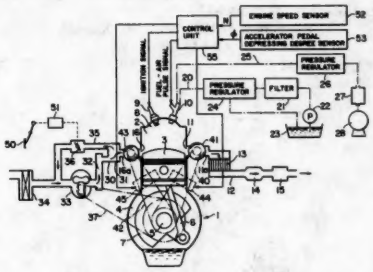
U.S. Cl. 123—65 V **6 Claims**

1. A two-cycle engine having a cylinder, a piston slidable in the cylinder, an exhaust port for being opened and closed by the piston, a scavenge port for being opened and closed by the piston, a scavenge pump connected to said scavenge port for supplying scavenging air into the cylinder, and a fuel injector for injecting fuel into the cylinder, comprising:

an exhaust rotary valve connected to said exhaust port for opening and closing the exhaust port;

a scavenge rotary valve connected to said scavenge port for opening and closing the scavenge port;

detector means for detecting an operating condition of the engine; and



control means responsive to the operating condition of the engine for variably controlling timings of opening and closing the exhaust and scavenge rotary valves.

4,995,355

RAPID SHUT-OFF SYSTEM FOR A TRUCK ENGINE

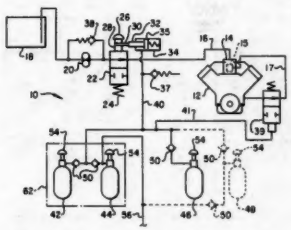
Trent E. Cowley, Wright, Wyo., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 403,633, Sep. 6, 1989, Pat. No. 4,926,815. This application May 8, 1990, Ser. No. 520,692

The portion of the term of this patent subsequent to May 20, 2007, has been disclaimed.

Int. Cl.[5] F02B *77/00*

U.S. Cl. 123—198 DB **7 Claims**



1. An engine shut-off system particularly adapted for use in conjunction with a propulsion engine for an off-highway vehicle such as a large dumper truck and the like, said system comprising:

a supply conduit for supplying fuel to said engine and in communication with a source of fluid fuel;

fuel flow shut-off valve means interposed in said conduit, said shut-off valve means including means for biasing said shutoff valve means to an open position and being actuated to a closed position by pressure fluid operated valve actuating means; and

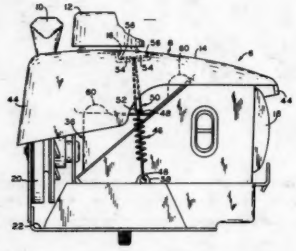
a source of pressure fluid disposed for operation from at least one of an operator's cab for said vehicle and a position in proximity to the ground surface and exterior of said vehicle for operation of said actuating means to cause said shut-off valve means to shut off fuel flow to said engine.

4,995,356

ENGINE FUEL TANK SHROUD HAVING DAMPENED SPRING RETAINERS

Peter G. Kronich, Sheboygan, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Jun. 4, 1990, Ser. No. 532,438
Int. Cl.[5] F02B 77/00
U.S. Cl. 123—198 E 27 Claims



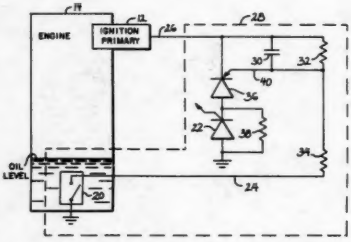
1. An internal combustion engine comprising:
a crankcase including a first mounting portion;
a fuel tank and shroud unit disposed over said crankcase, said shroud unit including a second mounting portion engaging said first mounting portion which results in a nonrigid attachment that minimizes unit fatigue or detachment caused by vibrations; and
spring means for resiliently clamping said shroud unit to said crankcase.

4,995,357

ENGINE SHUT-OFF CIRCUIT

John B. Gonnering, West Bend, and Paul A. Tharman, Milwaukee, both of Wis., assignors to Briggs & Stratton Corporation, Wauwatosa, Wis.

Filed Nov. 13, 1989, Ser. No. 435,284
Int. Cl.[5] F02B 77/00
U.S. Cl. 123—198 DC 4 Claims



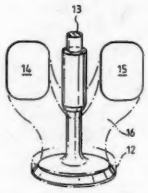
1. In an apparatus having an internal combustion engine including a crankcase containing oil and an ignition system having a main core that includes a primary winding to produce ignition pulses, the improvement of a circuit for shutting off the engine, comprising:
a first switch that is activated when a particular condition exists;
an electronic switch connected in circuit with said primary winding;
switch control means, connected in circuit with said first switch and with said electronic switch and including a voltage divider, for turning on said electronic switch to ground the ignition pulses and shut off said engine when said first switch is activated; and
indicator means for indicating that the ignition pulses are being grounded
said ignition system being grounded via said electronic switch and said indicator means when said electronic switch is on.

4,995,358

INTERNAL COMBUSTION ENGINES

Robert J. Gayler, and Timothy M. Lancefield, both of Ashford, England, assignors to Piper-Mechadyne Limited, Oxfordshire, England

PCT No. PCT/GB88/00914, § 371 Date Apr. 11, 1990, § 102(e) Date Apr. 11, 1990, PCT Pub. No. WO89/03932, PCT Pub. Date May 5, 1989
PCT Filed Oct. 21, 1988, Ser. No. 469,439
Claims priority, application United Kingdom, Oct. 23, 1987, 8724872
Int. Cl.[5] F01L 3/00
U.S. Cl. 123—188 M 8 Claims



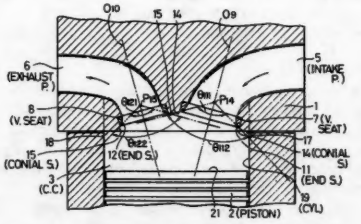
1. A dual duct portion system for an internal combustion engine, which system comprises a pair of juxtaposed supply ducts (14,15) which merge into a single supply passage (16) formed to define a venturi section (17) and communicating with a valve port (11) with the single supply passage surrounding the stem of a poppet valve (13) associated with the valve port, characterized in that said supply ducts each comprise a bent supply duct (14,15) and in that each bent supply duct is provided with means (20,22) for creating eddies in the gas flow at a specific position along the radially inner region of the duct bend to cause a controlled breakaway of the gas flow at that position and subsequent reattachment of the gas flow with the wall of the respective supply duct or of said passage and wall portion (21) at a radially outer region of the duct bend, which portion bulges radially outwardly of the tubular envelope defining the profile of the respective supply duct.

4,995,359

COMBUSTION CHAMBER FOR INTERNAL COMBUSTION ENGINE

Junichi Yokoyama; Tomonori Urushihara, both of Yokosuka; Teruyuki Itoh, Tokyo, and Hiroyuki Fujii, Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jun. 27, 1989, Ser. No. 372,245
Claims priority, application Japan, Jun. 28, 1988, 63-160210
Int. Cl.[5] F02M 35/10
U.S. Cl. 123—188 M 26 Claims



1. A combination chamber for an internal combustion engine having a cylinder, a cylinder head, a piston, at least one intake

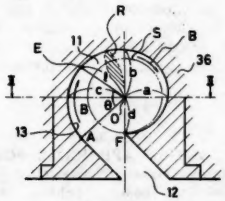
valve seat for supporting an intake valve at an intake port, at least one exhaust valve seat for supporting an exhaust valve at an exhaust port, and an ignition plug, wherein an intake side conical wall surface is formed in an inner wall of the cylinder head in continuous connection with a conical surface formed at an end of the intake valve seat to smoothly introduce intake air into the cylinder through the intake valve, and wherein an apex of the intake side conical wall surface matches an apex of the conical surface formed at the end surface of the intake valve seat.

4,995,360

COMBUSTION CHAMBER

Toshiaki Adachi, Fujisawa, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

Filed Aug. 16, 1989, Ser. No. 394,456
Claims priority, application Japan, Aug. 31, 1988, 63-214824
Int. Cl.[5] F02B *19/00*
U.S. Cl. 123—262 **20 Claims**



1. A combustion chamber for an internal combustion engine, comprising:

a piston having a main combustion chamber formed in the top thereof;

an auxiliary combustion chamber formed in the cylinder head of said engine and within which air may swirl; and,

passage in said cylinder head connecting said main combustion chamber with said auxiliary combustion chamber and directing air from said main combustion chamber into said auxiliary combustion chamber during the compression stroke of said piston,

said auxiliary chamber having a wall defining a generally spherical cavity communicating with one end of said passage, the distance between the center of said cavity and said wall being reduced from said one side of said passage in the direction of air swirl within said auxiliary combustion chamber all the way around said auxiliary combustion chamber to the area at which said auxiliary combustion chamber meets the opposite side of said passage.

4,995,361

DENTAL FLOSS TOOL

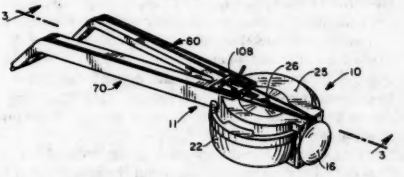
Moises B. Lorenzana, 601 Lake Hinsdale Dr., Willowbrook, Ill. 60559, and Vance A. Lorenzana, 698 Spring Hill Cir., Naperville, Ill. 60540

Filed Jan. 27, 1989, Ser. No. 302,602
Int. Cl.[5] A61C *15/00*
U.S. Cl. 132—324 **15 Claims**

1. A dental floss, comprising:

a floss housing having a fixed spool of dental floss located therein, said fixed spool of dental floss being symmetric about a spool axis, said floss housing having an aperture formed in said floss housing in substantial alignment with said spool axis for withdrawal of a quantity of dental floss from said housing;

a fork attached to said housing having a first arm and a second arm, said first arm having a first arm portion extending from said housing substantially at a right angle to said spool axis, said second arm having a second arm portion extending from said housing substantially at a right angle with respect to said spool axis, said first and second arms each being formed with a lengthwise extending groove from said housing to an end remote from said housing, and a dental floss lock means mounted on said the other opposite said fork for locking both ends of a length of floss, extending the entire length of said first and second arms within said grooves and extending and between said remote ends of said first and second arms, said lock means being substantially aligned with said grooves in said first



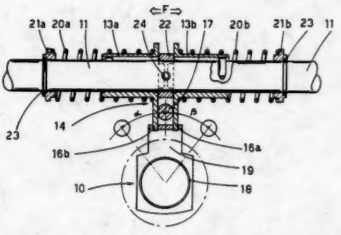
and second arms, said first and second arm portions being at an acute angle to each other and being readily flexed to tension the dental floss extending between said first and second arms, said lock means being positioned to permit securing of the free end of a length of floss one end of which is already secured to said lock means so that the resilience of said arm portions will maintain said length of floss under tension with both ends secured to said lock means.

4,995,362

MALFUNCTION OVERRIDE DEVICE FOR THE FUEL INJECTION SYSTEMS OF COMPRESSION-IGNITION ENGINES

Mario Brighigna, Cento, Italy, assignor to VM Motori S.P.A., Italy

Filed Jan. 30, 1990, Ser. No. 472,321
Claims priority, application Italy, Sep. 7, 1989, 3613 A/89
Int. Cl.[5] F02D *31/00*; F02B *77/00*
U.S. Cl. 123—365 **5 Claims**



1. A malfunction override device applicable to the fuel injection system in a compression-ignition diesel engine, comprising:

a crankcase and block accommodating a plurality of pistons disposed parallel one with another and invested with reciprocating motion;

a cylinder head fitted over and combining with the block to create a plurality of combustion chambers, and supporting a corresponding plurality of fuel injectors mounted each with one end penetrating the relative combustion chamber and connected by the remaining end to one corresponding element of a fuel injection pump;

drive means, synchronized with the movement of the pistons, by which the elements of the injection pump are engaged and operated;

rotatable means associated with each element of the injection pump and serving to meter the volume of fuel supplied to the relative injector;

a control rod disposed parallel to the drive means and adjacent to the injection pump, by which the metering means of the various pumping elements are interconnected, exhibiting a plurality of rigidly associated shoulders located one alongside each element, and linked at one end to control means capable of inducing rectilinear movement of the rod such as will ensure uniform operation of all the metering means in concert;

a plurality of sliders associated with the control rod in contraposed pairs, each pair positively separated by a respective shoulder, capable singly of movement in relation to the rod and affording peripherally embodied linkage and transmission means that project transversely in the direction of an adjacent pump element in such a way as to engage and maneuver the relative metering means between two limit positions corresponding respectively to the maximum and minimum delivery settings of the injection pump;

tension means associated with each slider, located between the control rod on the one hand and the relative slider on the other, of which the elastic force is calibrated with respect to the rectilinear reaction force of the rotatable metering means in a way such as enables continued rectilinear movement of the rod even in the event that regular movement of at least one of the metering means between its two limit positions should become inhibited.

4,995,363

THROTTLE CONTROLLER

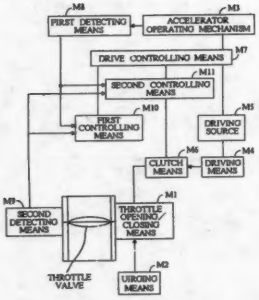
Tadashi Terazawa, Toyota; Hiroshi Nakashima, Nishio, and Yoshinori Taguchi, Nagoya, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed May 14, 1990, Ser. No. 523,026

Claims priority, application Japan, May 29, 1989, 1-135253

Int. Cl.[5] F02D *11/10*

U.S. Cl. 123—399 **3 Claims**



1. A throttle controller including throttle opening and closing means for opening and closing a throttle valve, urging means for urging said throttle opening and closing means in a direction in which said throttle valve is closed, an accelerator operating mechanism, driving means capable of driving said throttle opening and closing means independently of said accelerator operating mechanism in directions in which said throttle valve is opened and closed, a driving source for rotatively driving said driving means, clutch means for connecting and disconnecting said throttle opening and closing means and said driving means, and drive controlling means for controlling the engagement and disengagement of said clutch means and controlling the driving of said driving source in response to at least the accelerator operation of said accelerator operating mechanism, said throttle controller comprising:

first detecting means for outputting a signal corresponding to an amount of the accelerator operation of said accelerator operating mechanism;

second detecting means for outputting a signal corresponding to an opening of said throttle valve;

first controlling means for permitting drive control by said drive controlling means in such a manner that said clutch means separates said throttle opening and closing means from said driving means, when an output signal of said first detecting means is a signal representative of an amount of operation not more than a predetermined amount of accelerator operation and when an output signal of said second detecting means is a signal representative of an opening exceeding a predetermined throttle opening; and

second controlling means disposed in parallel with and independently of said first controlling means and adapted to permit control of the driving of said clutch means by said drive controlling means, said second controlling means permitting control of the driving of said clutch means by said drive controlling means in such a manner that said clutch means connects said throttle opening and closing means and said driving means, when an output signal of said first detecting means is a signal representative of an amount of operation not more than said predetermined amount of accelerator operation and when an output signal of said second detecting means is a signal representative of an opening exceeding said predetermined throttle opening.

4,995,364

THROTTLE CONTROL APPARATUS FOR ENGINES

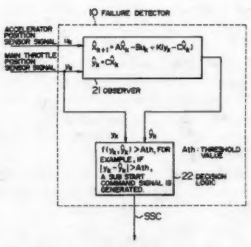
Eiichi Kamei, Nagoya; Hideaki Namba, Obu; Masahiro Ohba, Okazaki; Shinichiro Tanaka, Mishima, and Keiji Aoki, Susono, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kabushiki Kaisha, Toyota, both of, Japan

Filed Jan. 10, 1990, Ser. No. 463,035

Claims priority, application Japan, Jan. 18, 1989, 1-010234

Int. Cl.[5] F02M *7/00*

U.S. Cl. 123—442 **14 Claims**



1. A throttle control apparatus for engines comprising:

a throttle valve provided in an intake pipe of, an engine for controlling an intake air flow;

an additional actuator for controlling the operation of the engine;

command means for generating a throttle opening command signal indicative of a command value for controlling the intake air flow into the engine; and

throttle control system including driving means for electrically driving the throttle valve, detecting means for detecting a position of the throttle valve and producing a throttle position signal, and electronic control means for calculating a control signal from the throttle position signal and the throttle opening command signal and applying the control signal to said driving means,

said electronic control means comprising:

observer means for outputting a presumed value of the position of the throttle valve when the throttle valve is normally operating and has not failed, the presumed value

being obtained in accordance with a mathematical model of said throttle control system; and

decision means for comparing the throttle position signal with the presumed value from said observer means and outputting a start command signal to drive said additional actuator when said decision means has decided that said throttle control system has failed.

4,995,365

SYSTEM FOR DETECTING ENGINE IGNITION FAILURES IN AN INTERNAL COMBUSTION ENGINE

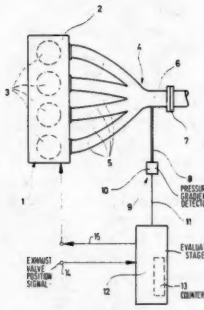
Helmut Denz, Stuttgart, and Werner Herden, Gerlingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 19, 1989, Ser. No. 453,403

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1989, 3903566

Int. Cl.[5] F02M *51/00*

U.S. Cl. 123—479 **18 Claims**



1. Apparatus for detecting ignition failures in an internal combustion engine having a plurality of cylinders for internal combustion, exhaust valves for each of said cylinders and an exhaust manifold having a collecting tube and connections thereof to each of said exhaust valves, said apparatus comprising:

a pressure gradient sensor means (10), exposed to pressure prevailing inside said exhaust manifold and to pressure gradients passing downstream of said exhaust valves, for sensing pressure shock waves generated by opening of said exhaust valves without regard to slower fluctuations of pressure in said manifold; and

an evaluation stage (12) electrically connected to said pressure gradient sensor means and having means for detecting and reporting a pressure wave deficiency relating to the opening of any of said exhaust valves.

4,995,366

METHOD FOR CONTROLLING AIR-FUEL RATIO FOR USE IN INTERNAL COMBUSTION ENGINE AND APPARATUS FOR CONTROLLING THE SAME

Toshio Manaka, Katsuta, and Masami Shida, Mito, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 8, 1989, Ser. No. 404,649

Claims priority, application Japan, Sep. 19, 1988, 63-232507

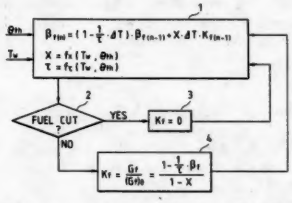
Int. Cl.[5] F02D *41/10, 41/12*

U.S. Cl. 123—492 **10 Claims**

1. A method of controlling air-fuel ratio in an internal combustion engine, comprising the steps:

detecting operating parameters of said internal combustion engine including intake air flow amount, a physical quantity representing the load on the internal combustion engine and engine speed;

calculating at intervals ϕT a fuel adhesion amount βf corresponding to a ratio of an amount of fuel adhering to an inner wall surface portion of an intake pipe of the internal combustion engine during a transient state of operation of



the engine to an amount of fuel supplied during steady state operation of the engine, using the following relationship:

$$\beta_{f(n)} = \left(1 - \frac{1}{\tau}\phi T\right) \cdot \beta_{f(n-1)} + X \cdot \phi T \cdot K_{f(n-1)}$$

where X is the rate of adhesion of fuel to said inner wall surface portion, τ is the evaporation time constant of fuel adhering to said inner wall surface portion, ϕT is the calculation cycle time period and K_f is a transitional correction coefficient;

calculating the transitional correction coefficient K_f using the following relationship:

$$K_f = \frac{1 - \frac{1}{\tau} \cdot \beta_{f(n)}}{1 - X}$$

calculating a basic fuel injection amount using said detected operating parameters; and

controlling air-fuel ratio during a transitional operating state of the internal combustion engine by adjusting said basic fuel injection amount using said calculated transitional correction coefficient K_f.

4,995,367

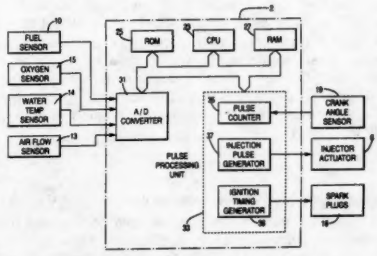
SYSTEM AND METHOD OF CONTROL OF INTERNAL COMBUSTION ENGINE USING METHANE FUEL MIXTURE

Teruo Yamauchi, Farmington Hills, Mich., and Akao Sasayama, Bronxville, N.Y., assignors to Hitachi America, Ltd., Tarrytown, N.Y.

Filed Jun. 29, 1990, Ser. No. 545,711

Int. Cl.[5] F02B *75/12*

U.S. Cl. 123—494 **32 Claims**



1. A system for controlling an internal combustion engine operating on a fuel mixture of gasoline and methanol, comprising:

a fuel sensor for detecting the mixture ratio (P) of methanol to gasoline in the fuel mixture to be supplied to said internal combustion engine;

at least one fuel injector for supplying a metered amount of fuel mixture at periodic intervals to a cylinder of said internal combustion engine; and

a control unit for controlling said fuel injector, including:

(1) means for calculating an air/fuel ratio (A/F) according to the following relationship:

$$A/F = 14.8 - 0.0853P$$

(2) means for determining a fuel injector opening time period based on said calculated air/fuel ratio; and

(3) means for periodically actuating said fuel injector based on said determined fuel injector opening time.

4,995,368

FUEL INJECTION TIMING APPARATUS

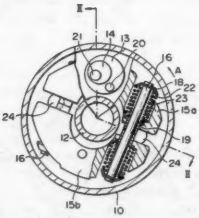
Masayuki Nakamura, Toyota; Kazuyuki Katayama, Obu, and Yasuhiro Furuhashi, Anjo, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Hino Jidosha Kogyo Kabushiki Kaisha, Hino, both of, Japan

Filed Feb. 3, 1989, Ser. No. 305,894

Claims priority, application Japan, Feb. 4, 1988, 63-024760

Int. Cl.[5] F02M *39/00*

U.S. Cl. 123—501 **8 Claims**



1. A fuel injection timing apparatus comprising:

a pair of opposed weights adapted to be connected to an engine for synchronous rotation with the engine, said weights having an initial position and being movable away from each other in proportion to centrifugal forces acting on said weights as a result of rotation thereof and being adapted to be operatively connected to a fuel injection pump to control injection timing thereof in accordance with movement of said weights;

means for biasing said weights to return the same close to each other in the absence of said centrifugal forces;

at least one stopper provided adjacent opposed ends of said weights to be movable in a direction perpendicular to a direction of movement of said weights; and

temperature-sensitive driving means for moving said stopper in accordance with ambient temperatures, whereby said stopper being moved in response to the ambient temperatures to project between the opposed ends of said weights and restrain said weights which tend to return to their initial positions by a force of said biasing means, so that the fuel injection timing is varied in response to the ambient temperatures when the engine is operated at low rotational speeds.

4,995,369

REGULATED FLOW CANISTER PURGE SYSTEM

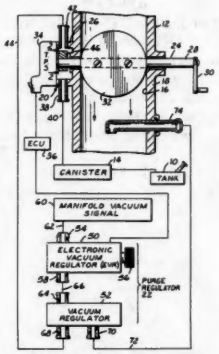
John E. Cook, Chatham, Canada, assignor to Siemens-Bendix Automotive Electronics Limited, Chatham, Canada

Filed Dec. 18, 1989, Ser. No. 452,664

Int. Cl.[5] F02M *25/08*

U.S. Cl. 123—520 **20 Claims**

1. In an evaporative emission control system of an internal combustion engine wherein volatile fuel that has evaporated from a liquid fuel tank is collected in a collection canister that, under certain engine operating conditions detected by an electronic control system of the engine, is purged to the engine by a purge regulator under the control of said electronic control system so as to cause collected fuel vapors to be combusted by the engine, the improvement which comprises a variable orifice that conjointly with said purge regulator exercises control over the vapor flow from said canister to the engine and functions to selectively restrict vapor flow from the canister to the



engine in correlation with the degree to which the engine is being throttled, and a sensor for supplying the electronic control system with a signal indicative of the degree to which the engine is being throttled and hence also the degree of restriction imposed by said variable orifice on the flow from the canister to the engine so that the electronic control system can take the degree of restriction imposed by said variable orifice into account in setting the purge regulator.

4,995,370

LINKED OPERATING DEVICE FOR MULTIPLE CARBURETORS

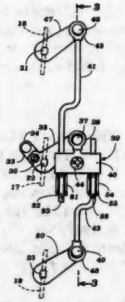
Hirofumi Imaeda, and Kyoji Hakamata, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushika Kaisha, Hamamatsu, Japan

Filed Feb. 22, 1990, Ser. No. 483,102

Claims priority, application Japan, Feb. 23, 1989, 1-43988

Int. Cl.[5] F02B *13/00*

U.S. Cl. 123—583 **5 Claims**



1. A synchronizing mechanism for synchronizing the operation of a plurality of butterfly valves operated by a single operator for the induction system of an engine comprising means for directly coupling said operator to one of said butterfly valves, an operating member affixed to said one butterfly valve for movement therewith, a coupling member coupled for movement with said operating member, a rod coupled to the

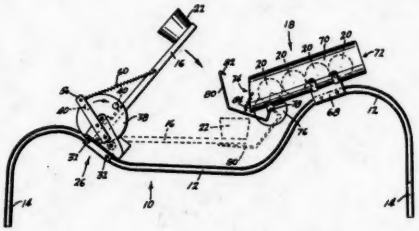
other of said throttle valves and slidable relative to said coupling member, biasing means interposed between said rod and said coupling member for urging said rod relative to said coupling member and means for clamping said rod to said coupling member.

4,995,371

BALL THROWING MACHINE

Joseph Kuizinas, 34 Merriam Rd., North Oxford, Mass. 01537

Filed Jan. 29, 1990, Ser. No. 471,620
Int. Cl.[5] F41B *3/04;* A63B *69/40*
U.S. Cl. 124—7 16 Claims



16. An automatic ball-tossing device comprising, in combination:

(a) a turnable shaft part,

(b) power means for turning said shaft part,

(c) a catapult arm part having means for releasably carrying a ball,

(d) means driven by said shaft part for causing said arm part to automatically periodically move against and away from said shaft part, and

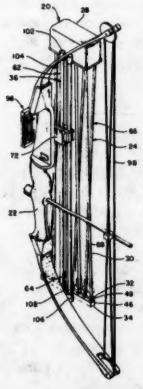
(e) cushioning means carried by one of said parts and engageable with the other part, for absorbing the impact when the arm part moves to strike against the shaft part.

4,995,372

QUIVER HAVING A NECK-GRIPPING AND ALIGNMENT MECHANISM

Kenneth D. Topel, 11220 - 164th St. E., Puyallup, Wash. 98374

Continuation of Ser. No. 120,571, Nov. 12, 1987, abandoned.
This application May 25, 1989, Ser. No. 358,454
Int. Cl.[5] F41B *5/06*
U.S. Cl. 124—25.5 11 Claims



1. A quiver for holding a plurality of arrows, each of said arrows including a point, a nock, and a shaft joining said point and said nock, said quiver comprising:

first means for releasably holding the points of said arrows in spaced relationship to one another;

second means for releasably engaging the nocks of said arrows in spaced relationship to one another, said second means including a nock bar having discrete arrow separation means for receiving said nocks, each said separation means holding one nock, said arrow separation means including a series of adjacent boxlike compartments having a first wall separating each compartment from the next and a second wall that includes a nock-receiving edge that fits into a slot formed in the nock of said arrow; and

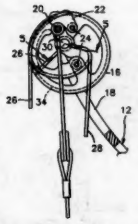
a mounting bar connecting said first and second means.

4,995,373

CABLE AND BOWSTRING RETAINER ARRANGEMENT FOR COMPOUND ARCHERY BOW

Kevin R. Mussack, Clifton Springs, N.Y., assignor to Golden Eagle Archery, Inc., Farmington, N.Y.

Filed Mar. 26, 1990, Ser. No. 498,965
Int. Cl.[5] F41B *5/00*
U.S. Cl. 124—25.6 2 Claims



1. A retainer arrangement for a compound bow of the kind having a handle, elongated flexible limbs mounted at opposite respective ends of the handle, tension cables for tensioning a bowstring between the distal ends of the limbs, and cam-like rotatable elements at the distal ends of the limbs for receiving terminal portions of the cables and the bowstring, the arrangement comprising cylindrical pins, one of said pins being fixed at the end of each cable extending radially therefrom and having a circumferential groove at its end away from the cable, said pin extending through an axial aperture in one of the rotatable elements and receiving the bowstring in said circumferential groove, when assembled the cable lying on one face of said one rotatable element and the bowstring lying on the opposite face thereby entrapping the pin in the aperture.

4,995,374

THROW AND FETCH DOGGIE TOY

William L. Black, 2800 N. State Rd. 7, Margate, Fla. 33063

Filed Feb. 23, 1990, Ser. No. 484,126
Int. Cl.[5] A01K *15/02;* A63B *69/40*
U.S. Cl. 124—54 66 Claims

66. A ball-launching system for a dog's ball comprising:

a ball-launching tube having a hollow interior, an open front end, and a rear end portion;

means for elevating said open front end of said tube a substantial distance above the level of said rear end portion

for launching a ball on an airborne path to be chased, fetched and returned by a dog;

means for feeding a returned ball into the hollow interior of said tube;

means for detecting a ball loaded into the hollow interior of said tube as it rolls downwardly past a predetermined position and before it comes to rest at a firing position adjacent said rear end portion of said tube; and

means operatively disposed exterior to said tube and at least partially behind said rear end portion of said tube and responsive to said detection means and to a predetermined time delay sufficient for said ball to come to rest in said firing position for launching same upwardly through the hollow interior of said tube, out of said open front end, and along said airborne path to again be chased, fetched and returned by said dog.

4,995,375

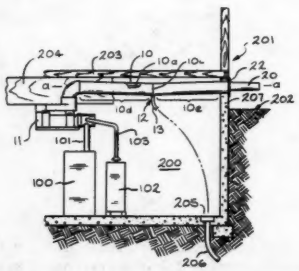
HEAT EXCHANGE PIPES FOR A FURNACE SYSTEM

Bert W. Jackson, 1219 Garfield Rd., Lansing, Mich. 48917

Filed Apr. 2, 1990, Ser. No. 502,816

Int. Cl.[5] F24C *3/00*

U.S. Cl. 126—85 B **12 Claims**



1. In a flue products exhaust and preheated combustion air supply assembly for use in association with a heating furnace wherein an air intake pipe is provided outside of and around an exhaust product pipe and wherein each of the pipes extend horizontally to openings outside of a building, the improvement which comprises:

(a) an air intake pipe and exhaust products pipe having a downwardly inclined section and then an upwardly inclined section from a horizontal axis with a lowest point between the inclined sections and between the furnace and the openings outside of the building into which liquid condenses from the flue products and with a conduit means from the exhaust product pipe through the air intake pipe in a sealed relationship at the lowest point for removing the condensed liquid; and

(b) a drain means connected to the conduit means to empty the condensed liquid from the conduit means.

4,995,376

PULSE FURNACE

Garry O. Hanson, 3055 Balsam Ct., Edgewood, Ky. 41017

Filed Jul. 12, 1989, Ser. No. 378,656

Int. Cl.[5] F24H *3/02;* **F23C** *11/04*

U.S. Cl. 126—110 C **26 Claims**

1. A furnace for heating ambient air, said furnace comprising:

(a) means for providing ambient air to be heated;

(b) a combustion assembly for combusting an air-fuel mixture;

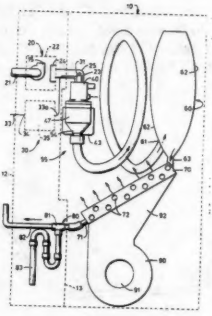
(c) means for providing combustion air to said combustion assembly;

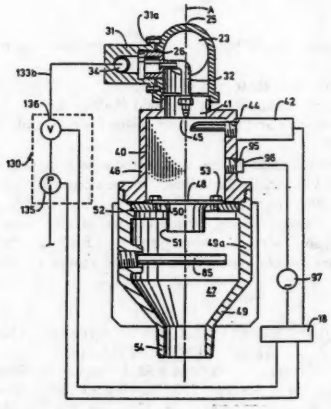
(d) means for providing fuel to said combustion assembly; and

(e) said combustion assembly comprising:

(i) an internal cavity having a mixing chamber and a combustion chamber;

(ii) an outlet in communication with said internal cavity and adapted to exhaust gases which result from the combustion of said air-fuel mixture;





(iii) a flame tube disposed intermediate said mixing chamber and said combustion chamber, said flame tube having an exit;

(iv) the cross sectional area of said outlet being less than the cross sectional area of said combustion chamber adjacent said flame tube exit; and

(v) means for igniting said air-fuel mixture within said mixing chamber.

4,995,377

DUAL AXIS SOLAR COLLECTOR ASSEMBLY

Glenn E. Eiden, 302 U.S. 30 East, New Haven, Ind. 46774

Filed Jun. 29, 1990, Ser. No. 546,010

Int. Cl.[5] F24J *2/38*

U.S. Cl. 126—424 **20 Claims**

1. A solar collector comprising:

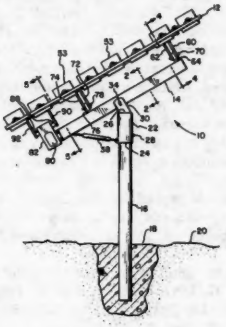
an elongate main boom having a longitudinal axis;

a solar collector frame;

first mounting means for pivotally mounting said solar collector frame to said main boom for pivotal motion about a first pivotal axis substantially parallel to the longitudinal axis of said main boom; and

first motor means, separate from said first mounting means,

mounted to said main boom and having a rotary output shaft coaxially aligned with said first pivotal axis and



drivingly connected to said frame, for pivoting said frame about said first pivotal axis.

4,995,378

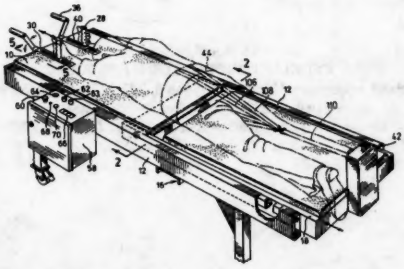
THERAPEUTIC TABLE

Allan E. Dyer, 1400 Dixie Rd., Suite 703, Mississauga, Ontario, Canada, and Ernest Savoia, Weston, Canada, assignors to Allan Dyer, Toronto, Canada

Continuation of Ser. No. 135,533, Dec. 17, 1987, abandoned, which is a continuation of Ser. No. 860,985, May 8, 1988, abandoned. This application Jun. 30, 1989, Ser. No. 376,154

Int. Cl.[5] A61H *1/02*

U.S. Cl. 128—75 **10 Claims**



1. A therapeutic table for use in applying traction to a patient's lumbar region when the patient is supported on the table in a prone position comprising:

a frame;

a table top having an upper-body section rigid with respect to said frame and a lower-body section slidably mounted with respect to said frame, said sections providing separable surfaces on which a patient may lie in a face-down prone position;

upper-body restraint means for restraining the patient with respect to the upper-body section, said restraint means including a pair of spaced hand grips which are rigid with respect to the upper-body section and extending upwardly from the plane of the table top to be accessible to a patient when resting upon the table with the arms extended above the head along the plane of the axis of the patient's spine to provide a manually releasable anchor for the upper body;

a pelvic belt anchor rigidly mounted with respect to the lower-body section to provide an anchor to which a pelvic belt can be connected;

extensible pneumatic cylinder and piston means extending between the frame and the lower-body section and operable to move the lower-body section with respect to the upper-body section to increase or decrease the distance between said upper-body restraint means and said pelvic belt anchor to apply traction through the patient's arms to the lumbar region of the spine;

said upper-body restraint means being completely releasable by the patient as said lower-body section moves with respect to said upper-body section to thereby permit the patient to limit the amount of traction placed on the lumbar region,

hydraulic damper means extending between the frame and the lower body section for damping the movement of the lower body section with respect to the frame to control the rate of movement of the lower-body section with respect to the upper-body section;

means for alternately applying a predetermined pneumatic pressure to said pneumatic cylinder and piston means in a first direction and a second direction opposite to said first direction to cyclically apply traction to a patient in use;

traction measuring means mounted on said pelvic belt anchor and connectable to a pelvic belt trap for measuring the tension in the strap and thereby determining the traction load applied to the patient;

means for translating the traction load detected by the traction measuring means into a digital read-out;

timing means responsive to the traction measuring means for controlling the timing of the movement of the lower-body section in each said direction.

4,995,379

INSTANT FACE LIFT

Joan Brooks, 6594 Bellaire Dr., New Orleans, La. 70124

Filed Mar. 13, 1989, Ser. No. 322,174

Int. Cl.[5] A61F *5/00*

U.S. Cl. 128—76 B **4 Claims**

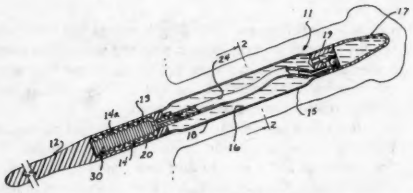
1. A face lift device comprising a flexible band of material adapted to be adhesively attached to a human scalp, said band being flat on a first surface, and having a plurality of loops provided on the opposing surface; a two-piece strap wherein the first strap piece has a first end that is adapted to be adhesively attached to one side of the wearer's head or neck and the second and end of said first strap piece is shaped to permit it to pass through one of the loops on the said band, the second strap piece has a first end that is adapted to be adhesively attached to the other side of the head or neck of the wearer, and the second end of the second strap piece has a locking member through which the second end of said first strap piece enters after it has passed through said one of the loops, whereby the strap can slide relative to its loop as the head of the wearer moves.

4,995,380

PENILE PROSTHESIS

James T. Maerzke, Kenosha, and Robert E. Trick, Racine, both of Wis., assignors to Medical Engineering Corporation, Racine, Wis.

Filed Nov. 7, 1989, Ser. No. 433,052
Int. Cl.[5] A61F 2/26
U.S. Cl. 128—79 4 Claims



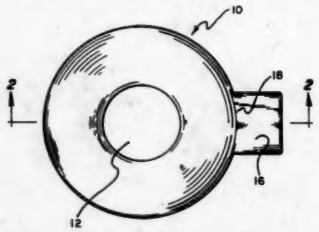
1. In a penile implant comprising a cylindrical member containing a pressure chamber, a reservoir for pressurizing fluid and means operatively connected between the reservoir and the pressure chamber for transferring fluid into the pressure chamber from the reservoir, the improvement in which the reservoir contains a longitudinally compressible and radially incompressible member which expands and prevents the reservoir wall from collapsing when the pressurizing fluid in the reservoir is transferred to the pressure chamber.

4,995,381

MALE THERAPEUTIC DEVICE

Joel L. Marmar, Cherry Hill, N.J., and Brian R. Henderson, Coopersburg, Pa., assignors to Performance Plus, Inc., Berlin, N.J.

Filed Oct. 2, 1989, Ser. No. 415,823
Int. Cl.[5] A61F 5/41
U.S. Cl. 128—79 10 Claims



1. A therapeutic device for assisting in the maintenance of an erection in the male penis comprising a continuous ring of elastic material having a substantially circular inner diameter and a circular cross-section adaptable to be placed about and snugly engage the base end of a penis with sufficient radial compressive force applied thereto during a penile erection to restrict outward venial flow of blood from the penis without complete occlusion of arterial blood flow, said elastic material consisting essentially of a very soft solid elastomeric material having a durometer hardness (Shore A) of between about 7 and 28 which is highly extensible, exhibits a very low modulus and will relax sufficiently after a period of use without conscious effort of a user to reduce the radial compressive force imposed thereby.

4,995,382

WOUND DRESSING, MANUFACTURE AND USE

Stephen M. Lang, Saffron Walden, and David F. Webster, Bishops Stortford, both of United Kingdom, assignors to Smith and Nephew Associated Companies Limited, United Kingdom

Continuation of Ser. No. 946,362, Dec. 24, 1986, abandoned, which is a continuation of Ser. No. 812,963, Dec. 24, 1985, abandoned, which is a continuation of Ser. No. 522,415, Aug. 11, 1983, abandoned, which is a continuation-in-part of Ser. No. 516,119, Jul. 20, 1983, abandoned, which is a continuation-in-part of Ser. No. 506,501, Jun. 21, 1983, abandoned, which is a continuation-in-part of Ser. No. 396,754, Jul. 9, 1982, abandoned, which is a continuation-in-part of Ser. No. 396,732, Jul. 9, 1982, abandoned, which is a continuation-in-part of Ser. No. 345,550, Feb. 3, 1982, abandoned, which is a continuation-in-part of Ser. No. 345,488, Feb. 3, 1982, abandoned. This application Apr. 28, 1989, Ser. No. 345,099
Claims priority, application United Kingdom, Feb. 13, 1981, 8104568; May 22, 1981, 8115742; Feb. 12, 1982, 8204132; Feb. 12, 1982, 8204133; Jun. 22, 1982, 8218088; Jul. 21, 1982, 8221112; Aug. 12, 1982, 8223254
Int. Cl.[5] A61L 15/00
U.S. Cl. 128—156 10 Claims

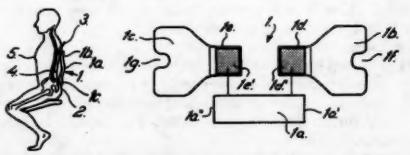
1. A wound dressing which consists essentially of a low adherency wound facing layer, an absorbent layer and an outer layer, wherein said low adherency wound facing layer has a wound contacting, first adhesive coating over its wound facing surface, said low adherency wound facing layer comprises a conformable apertured film, a conformable net of elastomer or an adhesive layer pattern spread in a conformable net-like configuration, the absorbent layer comprises a conformable hydrophilic foam and the outer layer is a continuous or discontinuous moisture vapour transmitting conformable backing layer which has a layer of a second adhesive on one surface thereof, at least one of said backing layer and said second adhesive layer being continuous to provide a barrier to bacteria and to liquid water.

4,995,383

CORRECTIVE POSTURE DEVICE

Roland Andersson, Hantverkargatan 4, 722 12 Västerås, Sweden

Filed Aug. 26, 1988, Ser. No. 236,931
Claims priority, application Sweden, Aug. 27, 1987, 8703313
Int. Cl.[5] A61F 13/00, 15/00
U.S. Cl. 128—157 2 Claims



1. A corrective posture device attachable to a person's body for indicating to a person wearing the device when that person has an undesirable back posture, said device being large enough to extend between the lumbar region of the back and the region of the lower or intermediate thoracic vertebrae comprising:

means for providing discomfort to a person wearing said device when the person has an undesirable back posture, said means comprising body attachment means for attaching said device to the person at two spaced-apart locations and adjustment means having a length sufficient to extend at least half the distance of a person's spine for adjusting a

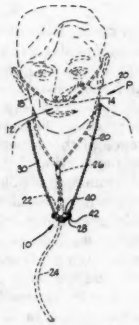
distance said device can be extended without providing discomfort to the person wearing the device, said attachment means including adhesive adhering said device to skin of the person's body at said two locations, the adhesive providing the discomfort by pulling on the person's skin when the adjusting means is extended, said adjustment means comprising an elongated flat strap and said attachment means comprising a pair of flat elements, one side of said elements being coated with said adhesive for securing said elements to the skin of a person wearing the device, each of said elements having fastening means on only a portion thereof for releasably holding a respective end of said strap, at least one of said elements including a cut-out in a portion thereof at which said fastening means is not located, said cut-out comprising a recess extending inwardly from an edge of said one element.

4,995,384

NECK SUPPORT FOR NASAL CANNULA

James L. Keeling, 5939 S. Newland St., Littleton, Colo. 80123

Filed Oct. 30, 1989, Ser. No. 429,071
Int. Cl.[5] A61M *15/08*
U.S. Cl. 128—207.18 **2 Claims**



1. In a nasal cannula assembly having a nasal cannula and having a pair of supply tubes connected to the nasal cannula and placed over and around a patient's ears and connected below the patient's chin to a main supply conduit, a neck support comprising:

a support bracket including a central opening therethrough for engaging the main supply conduit of the nasal cannula assembly and an access slot portion therethrough for providing access for the main supply conduit into the central opening;

neck securing means attached to said support bracket for placement loosely around the patient's neck said neck securing means comprising an endless loop of flexible chain that is placed across the access slot of said support bracket to prevent movement of the main supply conduit out of the central opening; and

said support bracket includes chain mounting openings through said support bracket located on either side of said central opening for attaching said flexible chain to said support bracket;

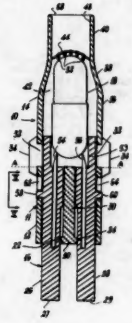
whereby the weight of the nasal cannula assembly and said support bracket are supported largely by said neck securing means.

4,995,385

INHALER WITH REGULAR COMPLETE EMPTYING OF THE CAPSULE

Luigi Valentini, and Giancarlo Ceschel, both of Milan, Italy, assignors to Phidea S.P.A., Milan, Italy

Filed Feb. 23, 1990, Ser. No. 483,744
Claims priority, application Italy, Feb. 23, 1989, 19539 A/89
Int. Cl.[5] A61M *15/08*
U.S. Cl. 128—203.21 **7 Claims**



1. An inhaler for administering medicaments in finely divided form contained in capsules, comprising:

a body enclosing a nebulization chamber, said nebulization chamber having a circular cross-section and being sufficiently large to enable the capsule to move during inhalation, said nebulization chamber further including:

(i) a plurality of air discharge apertures disposed at one end of said chamber whereby the air laden with said finely divided medicament may be drawn out of said chamber; and

(ii) a plurality of air inlet apertures provided near the end of the chamber opposite to said air discharge apertures, said inlet apertures allowing said chamber to communicate with the outside and said air inlet apertures being formed in such a manner as to generate within the chamber during inhalation a swirling air flow which passes through said air discharge apertures; and

(b) a piercing device which is movable within said body for the purpose of piercing the capsule at one end;

wherein the end surface of said nebulization chamber near said air discharge apertures is shaped such that when the capsule rests on said end surface during inhalation, said capsule does not substantially prevent air passage through any of the air discharge apertures, said nebulization chamber being tapered towards the end surface of said chamber which includes said air discharge apertures.

4,995,386

NEONSTAL MUCUS EXTRACTOR

Raymond C. Ng, 1737 Oak Grove Ave., San Marino, Calif. 91108

Continuation-in-part of Ser. No. 273,022, Nov. 18, 1988, Pat. No. 4,947,841. This application May 30, 1989, Ser. No. 358,566
Int. Cl.[5] A62B *7/00*
U.S. Cl. 128—205.19 **21 Claims**

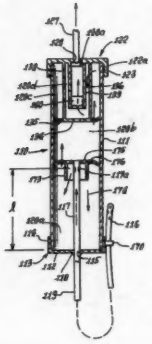
1. In a suctioning device for use in removal of fluid mucus from the trachea and nostrils of a newborn infant, to prevent aspiration of such fluid into the infant's lungs before first breath, the combination comprising:

(a) a vertically, longitudinally, upright container having a bottom wall with an opening therein to pass mucus into the container via a tubular catheter, and a top cap with an opening therein to pass suction air from the container interior toward a suction mouthpiece,

(b) a baffle means in the container to intercept upward flow of mucus toward the top cap,

(c) a duct in the container to receive flow of mucus via the opening in the bottom wall, the duct having an outlet end located to eject mucus to fall in a generally downward direction in the container,

(d) and a filter above the baffle, to filter air being sucked from the container interior toward the mouthpiece via the



top cap opening and wherein the filter and one part of the baffle means are carried by the top cap for endwise insertion downwardly into the upper extent of the container, which is tubular, and wherein there is a bottom cap on the container and which defines said bottom wall, the duct and another part of the baffle means are carried by the bottom cap for endwise insertion upwardly into the lower extent of the container.

4,995,387

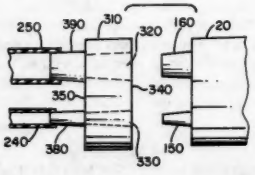
DUAL-PURPOSE CATHETER

Walter J. Jinotti, 10 Scott St., New Brunswick, N.J. 08903

Continuation of Ser. No. 871,789, Jun. 9, 1986, abandoned, which is a continuation-in-part of Ser. No. 577,986, Jul. 8, 1984, abandoned. This application Nov. 14, 1988, Ser. No. 270,057

Int. Cl.[5] A62B *9/02*

U.S. Cl. 128—205.24 **20 Claims**



1. A dual purpose catheter assembly comprising

a first flexible tube,

a second flexible tube,

one of said tubes being used to supply oxygen to a patient and the other of said tubes being used to apply suction to a patient,

each of said tubes having a patient end and a second end, both said second ends being adapted to be connected to valve means for controlling the alternate providing of oxygen and suction to a patient, and

a rigid unitary coupling member adapted to couple said first and second tubes to valve means for supplying oxygen and suction, said coupling member being secured to said second end of each of said first and second flexible tubes to form a unitary assembly of said coupling member and said first and second flexible tubes,

said coupling member, carrying said first and second flexible tubes, being adapted to be coupled to valve means for providing oxygen and suction,

said rigid coupling member and said first and second ends of said first and second tubes having such configuration that they can be coupled together in only one orientation which, when said rigid coupling member is coupled to valve means for supplying oxygen and suction, insures the correct coupling of oxygen and suction to a patient.

4,995,388

ARTIFICIAL AIRWAY DEVICE

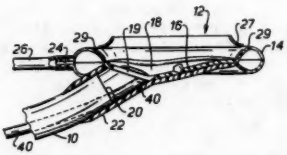
Archibald I. Brain, 10 Preston Drive, Wanstead, London E11, England

Filed Mar. 22, 1990, Ser. No. 512,791

Claims priority, application United Kingdom, Mar. 22, 1989, 8906570

Int. Cl.[5] A61M *16/00*

U.S. Cl. 128—207.15 **13 Claims**



1. An artificial airway device to facilitate lung ventilation in an unconscious patient, comprising an airway tube and a mask carried at one end of the airway tube, the mask having a flexible annular peripheral formation of roughly elliptical shape capable of conforming to and of readily fitting within the actual and potential space behind the larynx so as to form a seal around the circumference of the laryngeal inlet without the device penetrating into the interior of the larynx, the annular peripheral formation surrounding a hollow interior space or lumen of the mask into which the airway tube opens, and carrying a soft flexible upstanding collar surrounding the lumen of the mask, wherein the artificial airway device further comprises a drainage tube having one end region arranged for insertion with the mask and the other end capable of being positioned below the patient for extracting fluid from the area of the mask by syphonic action, or of being connected to suction apparatus for extracting such fluid by suction.

4,995,389

MULTIELECTRODE QUICK CONNECT CARDIAC PACING LEAD CONNECTOR ASSEMBLY

Donald L. Harris, Key Largo, Fla., assignor to Telectronics Pacing Systems, Inc., Suffield, Conn.

Filed Dec. 16, 1985, Ser. No. 809,665

The portion of the term of this patent subsequent to Dec. 29, 2004, has been disclaimed.

Int. Cl.[5] A61N *1/00*

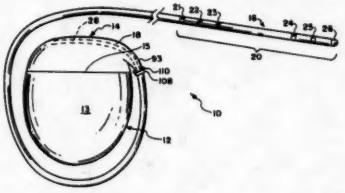
U.S. Cl. 128—419 P **24 Claims**

1. A cardiac pacing system including:

a multiconductor, multielectrode pacing lead having a distal end and a proximal end, and

a cardiac pacer comprising a metal case with a plurality of insulated conductor feedthroughs in a top side thereof and a neck mounted to said top side of said metal case, said neck being made of a soft pliable material, flexible means within said neck material for connecting each insulated conductor feedthrough to a specific electrode of a multielectrode pacing lead, said flexible connecting means comprising a plurality of U-shaped electrical contacts, each having a bight and two upstanding legs for contact-

ing ring contacts at the proximal end of the pacing lead, said neck having a lumen with a closed proximal end and an open distal end which receives said multiconductor pacing lead, said upstanding legs of each U-shaped electrical contact straddling the lumen in position to flexibly



engage and grip a respective ring contact on the pacing lead, and said neck having a slit on its top side extending along the length of the neck and inwardly to a position above said lumen and between upper ends of said two upstanding legs of each U-shaped contact.

4,995,390

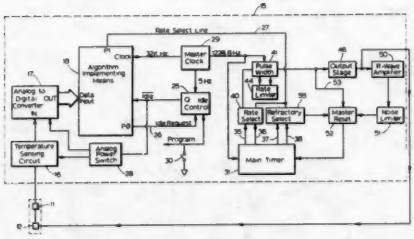
EXERCISE RESPONSIVE CARDIAC PACEMAKER

William A. Cook, Bloomington; Neal E. Fearnot, West Lafayette, and Leslie A. Geddes, W. Lafayette, all of Ind., assignors to Purdue Research Foundation, West Lafayette, Ind.

Continuation of Ser. No. 915,887, Oct. 2, 1986, Pat. No. 4,726,383, which is a continuation of Ser. No. 781,945, Sep. 30, 1985, abandoned, which is a continuation of Ser. No. 542,590, Oct. 17, 1983, Pat. No. 4,543,954, which is a continuation-in-part of Ser. No. 379,667, May 19, 1982, Pat. No. 4,436,092. This application Feb. 22, 1988, Ser. No. 158,402

Int. Cl.[5] A61N *1/36*

U.S. Cl. 128—419 PG **15 Claims**



1. A rate-responsive cardiac therapy device, comprising:
a reference-temperature memory;
a current-temperature sensor;
a cardiac rate control signal generator having one input coupled to said reference-temperature memory and another input coupled to said current-temperature sensor;
a cardiac pulse generator having an input coupled to said cardiac rate control signal generator;
a differentiator having an input coupled to said current-temperature sensor and an output coupled to said cardiac rate control signal generator; and
a base-heart-rate memory having an output coupled to said cardiac rate control signal generator;
wherein said cardiac rate control signal generator includes means responsive to said base-heart-rate memory for determining a first rate control factor;
means responsive to said reference-temperature memory and said current-temperature sensor for determining a second rate control factor proportional to the difference between current temperature and reference temperature;
means coupled to said differentiator for determining the sign of the derivative and for determining a third rate control factor therefrom; and
means for adding said first, second and third factors to form a cardiac rate control signal.

4,995,391

ELECTRODE DEVICE

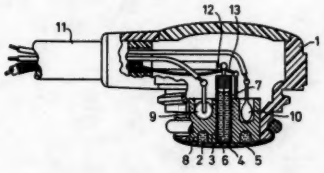
Ole J. Jensen, Soborg, and Steen G. Melberg, Bagsvaerd, both of Denmark, assignors to Radiometer A/S, Denmark

Continuation of Ser. No. 727,191, Apr. 26, 1985, abandoned, which is a continuation of Ser. No. 451,141, Nov. 22, 1982, abandoned. This application Jan. 24, 1986, Ser. No. 821,872

Claims priority, application Denmark, Mar. 20, 1981, 1252/81

Int. Cl.[5] A61B *5/14*

U.S. Cl. 128—635 **14 Claims**



1. An electrode device for determining the partial pressure of CO_2 and comprising an electrode housing, a CO_2-permeable membrane, a pH-sensitive measuring electrode arranged behind the membrane and having a measuring area which is in contact with a bicarbonate-containing exterior electrolyte which is present between the measuring area and the membrane and having an interior electrolyte and an interior reference electrode, and an exterior reference electrode in contact with the exterior electrolyte, the interior electrolyte being so adapted to the exterior electrolyte that the potential difference measured over the exterior reference electrode and the interior reference electrode at in vivo CO_2 partial pressure is substantially temperature-independent with a temperature dependence corresponding to a temperature dependence for the CO_2 partial pressure determination in the range $-1\%/°$ C. $-+1\%/°$ C.

4,995,392

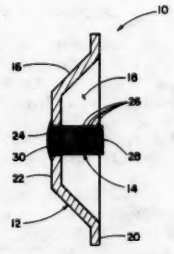
SELF-PREPARING ELECTRODE WITH REMOVABLE PLASTIC ABRADING BRUSH

Gary W. Sherwin, South Huntington Township, Westmoreland County; Edward E. Kovach, Penn Hills, and Albert L. Schmidt, Murrysville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 29, 1988, Ser. No. 290,390

Int. Cl.[5] A61B *5/04*

U.S. Cl. 128—639 **9 Claims**



1. A self-preparing electrode for sensing the electrical potential of a person's skin, comprising:
(a) a conductive disk having a first side, a second side and a

central aperture with said first side adapted to face the person's skin; and

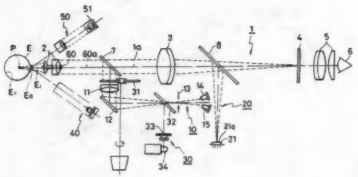
(b) a nonconductive multi-strand abrading brush frictionally mounted within said aperture in said disk and removable from said second side of said disk.

4,995,393

ALIGNMENT APPARATUS OF NONCONTACT TYPE TONOMETER

Kenjiro Katsuragi, and Kouji Nishio, both of Tokyo, Japan, assignors to Kabushiki Kaisha Topcon, Japan

Filed Apr. 6, 1989, Ser. No. 333,949
Claims priority, application Japan, Apr. 8, 1988, 63-86588
Int. Cl.[5] A61B *3/16*
U.S. Cl. 128—648 **7 Claims**



1. An alignment apparatus of a noncontact type tonometer, comprising:

a target projecting system for forming first and second target images on an eye, said target projecting system including a half mirror,

first and second light emitting sources for emitting light which impinges on said eye and respectively form said first and second target images, and

said first and second light emitting sources being oriented such that light emitted from both said first and second light emitting sources is reflected by said half mirror before impinging on said eye;

a fluid discharging nozzle for discharging a fluid along an axial line, the light emitted from both said first and second light emitting sources being directed along the axial line;

a light receiving sensor for providing a position signal representative of the position of light projected thereon;

an alignment light receiving optical system operatively coupled for receiving the first and second target images along the axial line of the nozzle and forming respective images of the first and second target images on said light receiving sensor; and

a control unit operatively coupled to receive said position signal and responsively determine the positions of the respective images of the first and second target images formed on said light receiving sensor, said control unit outputting an alignment completion signal when such determined positions are within a preset range on said light receiving sensor.

4,995,394

FAST NMR CARDIAC PROFILE IMAGING

Harvey E. Cline, and Christopher J. Hardy, both of Schenectady,, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 11, 1989, Ser. No. 392,315
Int. Cl.[5] A61B *5/05*
U.S. Cl. 128—653 A **14 Claims**

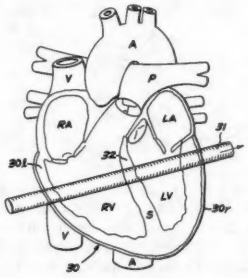
1. A method for providing a nuclear-magnetic-resonance (NMR) image of movement of a selected portion of a sample, relative to a predetermined center location at the origin of a set of axes defining an imaging volume, comprising the steps of:

(a) immersing the sample in a static magnetic field formed in the imaging volume;

(b) exciting spin magnetization of nuclei in a region of the sample defined by a relatively narrow elongated probe beam;

(c) moving the probe beam to extend through the selected sample portion;

(d) acquiring a NMR response signal from the excited region, in the presence of a readout magnetic field gradient oriented along the probe beam and with a magnitude establishing the location of the selected portion therealong; and



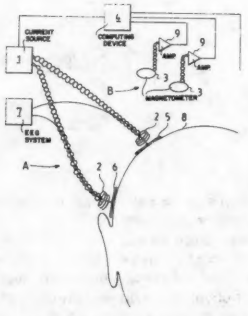
(e) displaying said acquired NMR response signal as a profile of the sample along the beam versus time.

4,995,395

METHOD AND APPARATUS FOR LOCATION FINDING OF ELECTRODES PLACED ONTO THE BODY, PARTICULARLY TO THE HEAD

Risto Ilmoniemi, and Seppo Ahlfors, both of Espoo, Finland, assignors to Neuromag OY, Espoo, Finland

Filed Aug. 30, 1989, Ser. No. 400,786
Claims priority, application Finland, Sep. 12, 1988, 884187
Int. Cl.[5] A61B *5/04; G01R 33/02*
U.S. Cl. 128—653 R **9 Claims**



6. An apparatus for finding locations of electrodes attached to a head, comprising:

a plurality of electrodes;

at least one first coil attached to each electrode, said at least one first coils attached to the electrodes forming a first coil group to be localized;

a plurality of second coils adapted to be arranged in a vicinity of the electrodes so that a position of said second coils is uniquely known, said second coils forming a fixed second coil group;

current means for generating a magnetic field with either said first coil group or said second coil group, whereby said coil group not generating the magnetic field is used for detecting the induced magnetic field;

measuring means electronically connected to said coil group detecting the induced magnetic field, for detecting a signal representing the induced magnetic field; and

data processing means , connected to said measuring means, for processing said signal to determine the position of the electrodes.

4,995,396

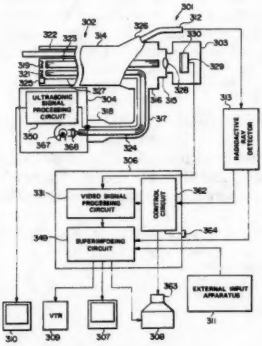
RADIOACTIVE RAY DETECTING ENDOSCOPE

Makoto Inaba; Masaaki Hayashi, both of Hachioji; Toshihiko Hashiguchi, Sagamihara; Hiroki Hibino, Hachioji; Hiroyuki Sasa, Tokyo, all of Japan; David E. Barlow, Hicksville, N.Y.; Yutaka Ohshima, Hachioji, Japan; Kohichiro Ishihara, Hachioji, Japan; Yutaka Yanagawa, Hachioji, Japan; Motoyuki Tagawa, Hachioji, Japan; Shuichi Takayama, Hachioji, Japan; Takashi Tsukaya, Hachioji, Japan; Frank Klosterman, Hicksville, and Jack Goodman, Huntington, both of N.Y., assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Dec. 8, 1988, Ser. No. 281,426

Int. Cl.[5] A61B *1/00, 1/06*

U.S. Cl. 128—654 **25 Claims**



1. A radioactive ray detecting endoscope comprising:

an elongated insertable part having a tip part and a rear end;

ultrasonic imaging means provided in the tip part of said insertable part and having a transmitting means for transmitting ultrasonic waves toward an observed part and receiving means for receiving echoes, from the observed part, of the ultrasonic waves emitted from said transmitting means, said ultrasonic imaging means for outputting a signal which forms an ultrasonic image of said observed part; and

a radioactive ray detecting means arranged in the tip part of said insertable part for detecting radioactive rays.

4,995,397

PULSE DOPPLER FLOW SPEED METER

Hisashi Nishiyama; Kageyoshi Katakura, and Toshio Ogawa, all of Tokyo, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 27, 1989, Ser. No. 413,060

Claims priority, application Japan, Sep. 30, 1988, 63-244164; Nov. 16, 1988, 63-287673

Int. Cl.[5] A61B *12/08*

U.S. Cl. 128—661.09 **9 Claims**

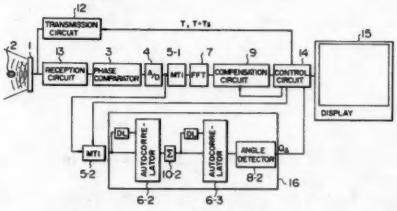
1. A pulse Doppler flow speed meter comprising:

transmission/reception means for transmitting repetitively to an object ultrasonic pulses in the form of pulsed continuous waves at first transmission intervals T during a first term but at second transmission intervals (T + Ts) during a second term following the first term and detecting reflected waves from the object which results from reflection of individual pulses;

phase detection means for detecting phases of the reflected waves;

filtering means for eliminating signals representative of stationary objects from phase signals sequentially produced from said phase detection means;

first Doppler shift angle calculating means for determining either distributions between phase shifts of phase signals delivered out of said filtering means which correspond to at least one of a first group of phase signals transmitted at first transmission intervals T and a second group of phase signals transmitted at second transmission intervals (T + Ts) or representative values of the distributions;



second Doppler shift angle calculating means for determining a first value of center of gravity of phase differences between the phase signals of said first group and a second value of center of gravity of phase differences between the phase signals of said second group and for determining a phase difference between said first and second values of center of gravity; and

compensation means responsive to an output signal of said second Doppler shift angle calculating means to compensate output signals of said first Doppler shift angle calculating means for their aliasing and for delivering compensated values indicative of either speed distributions of said object or representative values of the speed distributions.

4,995,398

CORONARY ANGIOGRAPHY IMAGING SYSTEM

Patrick A. Turnidge, 5334 Quail St. NE., Salem, Oreg. 97305

Filed Apr. 30, 1990, Ser. No. 516,763

Int. Cl.[5] A61B *5/02*

U.S. Cl. 128—668 **31 Claims**

1. A method of thermal coronary angiography for assessing graft patency, coronary anatomy and perfusion fields in coronary by-pass surgery, which comprises:

(a) positioning a thermal camera between 70° to 90° perpendicular to the exposed surface of the heart;

(b) positioning the thermal camera a distance between 0.8 meters to 1.2 meters from the exposed surface of the heart;

(c) setting the thermal camera to the expected temperatures such that expected temperatures are near one of the two ends of the scale;

(d) injecting cold crystalloid cardioplegia into a proximal vein graft; and

(e) recording and displaying images on a monitor in real time.

4,995,399

BLOOD PRESSURE MEASURING SYSTEM

Ressei Hayashi, Tokyo, and Tokuji Hayakawa, Komaki, both of Japan, assignors to Colin Electronics Co., Ltd., Japan

Filed Jul. 21, 1989, Ser. No. 382,991

Claims priority, application Japan, Jul. 26, 1988, 63-98601[U]

Int. Cl.[5] A61B *5/02, 5/0205*

U.S. Cl. 128—680 **14 Claims**

1. A blood pressure measuring system for continuously measuring blood pressure values of a subject, comprising

measuring means for repetitively measuring a blood pressure value of the subject;

display means for indicating a time-wise trend of the measured blood pressure values;

memory means for storing a plurality of sets of data representing a plurality of predetermined time-wise trends of blood pressure, respectively;

designating means for designating one of said plurality of sets of data such that the designated one set of data corresponds to a value of at least one parameter of the subject; and

control means for commanding said display means to indicate, according to the designated one set of data, a corresponding one of said plurality of predetermined time-wise trends of blood pressure, together with the time-wise trend of said measured blood pressure values.

4,995,400

PNEUMOTACH AND COMPONENTS THEREFOR

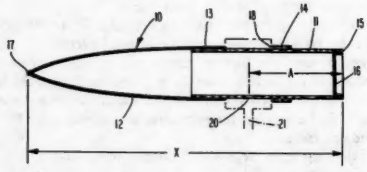
John R. Boehringer; Jay B. Nelson, both of Wynnewood, and John Karpowicz, Havertown, all of Pa., assignors to Boehringer Laboratories, Wynnewood, Pa.

Continuation of Ser. No. 412,227, Aug. 27, 1982, Pat. No. 4,807,641. This application Jan. 27, 1989, Ser. No. 303,493

The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.

Int. Cl.[5] A61B *5/08*

U.S. Cl. 128—725 **4 Claims**



1. A pneumotach flow tube with a mouthpiece end and an opposite end, with at least said mouthpiece end being of generally cylindrical construction, said opposite end being at least substantially closed against the passage of exhaled air therethrough, said flow tube having a substantially non-porous mouthpiece portion and a substantially porous portion between the non-porous portion and the closed end, a transverse pressure tap opening through the cylindrical wall of said substantially non-porous portion, said opposite end and said pressure tap opening each being located so spaced from the mouthpiece end and the porosity of the porous flow tube portion being so sized, to be sufficient to produce substantially laminar flow in the tube and to permit substantially linear flow pressure measurements through the tap opening at the location of said pressure tap opening.

4,995,401

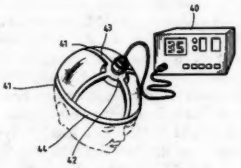
DEVICE FOR MEASURING ANTERIOR FONTANELLE PRESSURE

Leonid Bunegin, and Maurice S. Albin, both of San Antonio, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Filed Feb. 26, 1988, Ser. No. 160,870

Int. Cl.[5] A61B *5/00*

U.S. Cl. 128—748 **25 Claims**



1. A pressure sensing device comprising:

rigid housing having a base end and an end opposite said base end, said base end defining an opening adapted for engaging a cranium of an infant circumferential to the anterior fontanelle and said opposite end defining an aperture adapted to receive means for sensing pressure.

4,995,402

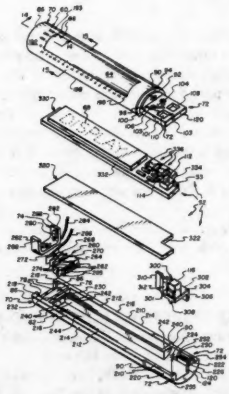
MEDICAL DROPLET WHOLE BLOOD AND LIKE MONITORING

Roger E. Smith, Bountiful; Mark E. Astill, Centerville; Jay L. Smith, Ogden, and Gale H. Thorne, Bountiful, all of Utah, assignors to Thorne, Smith, Astill Technologies, Inc., Ogden, Utah

Filed Oct. 12, 1988, Ser. No. 256,678

Int. Cl.[5] A61B *5/00*

U.S. Cl. 128—771 **38 Claims**



1. Whole blood analyte sensor structure comprising:

packet means comprising a plurality of disposable analyte sensor means for respective sequential use in testing of samples of whole blood for a predetermined analyte, the packet means comprising means by which the sensor means are contemporaneously loaded into an analyte instrument and means by which sensor means are sequentially disassociated from the packet means and discarded after use;

each sensor means comprising testing means responsive to said predetermined whole blood analyte upon delivery of

the whole blood to the testing means and means by which said response is measured.

4,995,403

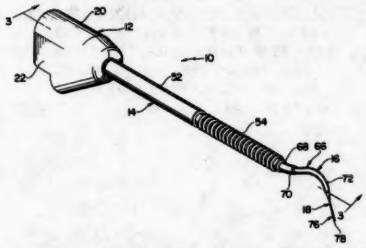
PERIODONTAL PROBE

Ralph A. Beckman; Henry D. Sharpe, III, both of Providence; Len Curado, East Greenwich, and James W. Barfoot, Providence, all of R.I., assignors to Bausch & Lomb Professional Dental Products, Inc., Tucker, Ga.

Filed Feb. 24, 1989, Ser. No. 315,131

Int. Cl.[5] A61B 5/103

U.S. Cl. 128—776 **17 Claims**



1. A periodontal probe comprising sequentially disposed, connected sensor, shaft and tip portions, and an elongated flexible fiber element extending longitudinally through said tip portion and at least a portion of said shaft portion, said tip portion terminating in a terminal end, said fiber element having distal and proximal ends and being assembled in said tip portion and said shaft portion so that it normally projects beyond the terminal end of said tip portion terminating in said distal end, said fiber element being supported in said tip portion and said shaft portion so that it is longitudinally slidable therein along a predetermined path of movement, said tip portion and said shaft portion being integrally and permanently connected, the combined length of said tip portion and said shaft portion being at least approximately 4½ inches, said sensor portion communicating with the proximal end of said fiber element for sensing relative longitudinal movement between said fiber element and said tip portion, said shaft portion being detachable from said sensor portion to permit replacement of said shaft portion, said tip portion and said fiber element.

4,995,404

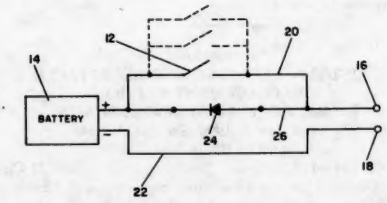
APPARATUS FOR TREATING BRUXISM

David C. Nemir, 1221 Baltimore Dr., El Paso, Tex. 79902

Filed Aug. 25, 1988, Ser. No. 236,455

Int. Cl.[5] A61B 5/103

U.S. Cl. 128—777 **33 Claims**



1. An aversive conditioning apparatus completely fittable into a user's mouth for treating both diurnal and nocturnal bruxism, said apparatus comprising:

a mouth guard housing comprising biting surfaces against which the user's teeth are positionable;

switch means communicating with said biting surfaces, said switch means being responsive to the user's biting said biting surfaces with force above a predetermined threshold amount, and to the cessation of the user's biting;

shock delivering electrode means communicating to a preselected portion of the user's mouth for delivering electric shock thereto, said electric shock being sufficient to consciously shock and alert the user when the user bites said biting surfaces with force above said predetermined threshold amount; and

means responsive to said switch means and operably connected to said shock delivering electrode means for providing electric current to said shock delivering electrode means only when said switch means is bitten with force above said predetermined threshold amount by user and for stopping said electric current to said shock delivering electrode means when the user ceases biting.

4,995,405

PROCESS AND APPARATUS FOR PRODUCING AROMATIZED STRAND-SHAPED SMOKING MATERIAL

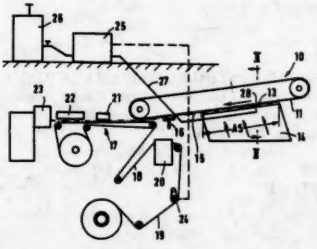
K. Dieter Lettau, Konz, Fed. Rep. of Germany, assignor to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Jun. 27, 1989, Ser. No. 372,413

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1988, 3821677

Int. Cl.[5] A24B 3/12, 9/00

U.S. Cl. 131—84.1 **3 Claims**



1. A process for producing aromatized strand-shaped smoking material in a strand machine comprising feeding tobacco for the formation of a tobacco layer (15) of increasing thickness via a settling path (AS) to a conveyer (10) and subsequently forming the tobacco layer into a strand, providing it with a wrapping (18) and dividing it into longitudinal sections, a liquid containing an aromatic substance being added to the tobacco during its transport, characterized in that while the tobacco accumulates at the conveyer (10), the liquid is inserted into a region which, upon termination of the tobacco accumulation, corresponds to the center of the thickness of the tobacco layer (15) onto which additional tobacco is deposited thereon, and characterized in that the liquid is applied in an airless jet.

4,995,406

APPARATUS AND METHOD FOR OPENING A REEL OF PAPER STRIPPING

Domingos da Silva, Cortaillod, Switzerland, assignor to Fabriques de Tabac Reunies, S.A., Neuchatel, Switzerland

Filed Feb. 27, 1989, Ser. No. 316,224

Claims priority, application Switzerland, Feb. 25, 1988, 711/88

Int. Cl.[5] A24C 5/00, 5/14

U.S. Cl. 131—105 **12 Claims**

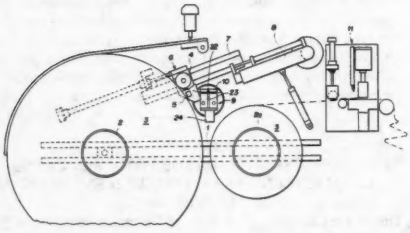
1. Apparatus for opening a closed reel of a strip wound in successive turns, comprising:

means for supporting the reel for rotation about a fixed axis at a predetermined location,

a roller for driving the reel having an axis parallel to the axis of the reel,

a knife assembly having a straight knife edge parallel to the axis of the reel, and movable to cut a plurality of turns of said strip, thus forming scraps and a leading edge of said strip,

a movable carriage bearing said roller and said knife assembly,



a fixed slide bearing said carriage,

suction and exhaust means, having a movable inlet able to be placed in proximity to said roller, and arranged for sucking in through said inlet the scraps cut from said strip by said knife, and for straightening the leading end of said strip, and

a movable holding member for fixing said straightened leading end of said strip.

4,995,407

NON-COMBUSTIBLE ARTIFICIAL CIGARETTE

Nicolas Kossiakoff, Chambourcy, and Daniel Augis, Nanterre, both of France, assignors to International Flavors & Fragrances, Inc., New York, N.Y.

Filed Jul. 25, 1989, Ser. No. 384,727

Int. Cl.[5] A24D *3/00*; A24F *47/00*

U.S. Cl. 131—359 **17 Claims**

1. A non-combustible artificial cigarette comprising a tube resembling a cigarette closed at both ends by porous plugs and confining a quantity of a vapor emitting tobacco-free material where said material includes at least one or more stress reactivity-reducing substances selected from the group consisting of nutmeg oil, mace extract, neroli oil, valerian oil, myristicin, elemicin, and isoelemicin, said quantity being chosen sufficient to evolve during the act of oral inhalation through said tube physiologically effective amount of vapor which becomes entrained in the inhalant.

4,995,408

COSMETIC SAMPLE APPLICATOR AND METHOD OF CONSTRUCTION

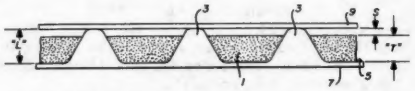
Gunnar J. Wallschlaeger, Fort Lauderdale, Fla., assignor to Lip-Prints, Inc., Pompono Beach, Fla.

Filed May 15, 1989, Ser. No. 351,708

Int. Cl.[5] A45D *40/26*

U.S. Cl. 132—320 **15 Claims**

1. A cosmetic sampler comprising: a base support; a coating of cosmetic composition having a predetermined thickness disposed upon said base support; a detachable cover for covering said coating and a multiplicity of finger-like projections extending and penetrating through said coating in a direction substantially transverse to said base support and said cover, respectively, with the projections distributed throughout said coating and having a length greater than the thickness of said



coating, such that said cover is spaced apart from said coating by said projections.

4,995,409

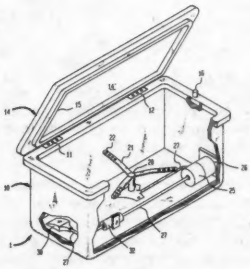
AUTOMOTIVE PARTS WASHER UTILIZING A VOLATILE CLEANING SOLUTION

Craig L. Watts, 30 W. Clarkston Rd., Lake Orion, Mich. 48035

Filed Jan. 29, 1990, Ser. No. 471,472

Int. Cl.[5] B08B *3/02*

U.S. Cl. 134—58 R **11 Claims**



1. An apparatus for cleaning automotive parts, particularly transmission parts, comprising:

a small, portable cabinet including four side walls and a bottom adapted to contain a volatile cleaning solution;

a lid hingedly attached to one of said side walls and including a transparent central portion to permit viewing a part being cleaned inside said cabinet, said transparent portion being delineated by a seal for contacting the upper end of said side walls on the inside of said lid;

a closed system for recycling said cleaning solution including a three arm rotating spray device supported on the bottom of said cabinet adapted to provide a cleaning action to said part, each said arm including spray holes at the outer end thereof;

means for supporting the part to be cleaned;

a filter for said solution to pass through; and

means for circulating said cleaning solution through said rotating spray device.

4,995,410

OSTOMY CLEANING AND RECEPTACLE REPLACEMENT STATION

Richard L. Lash, P.O. Box 8, Montpelier, Id. 83254

Filed Jan. 9, 1990, Ser. No. 462,644

Int. Cl.[5] B08B *3/02, 13/00*

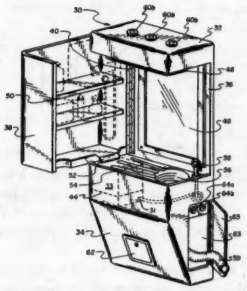
U.S. Cl. 134—113 **21 Claims**

1. A station for use in storing, replacing and cleaning an ostomy bag and its associated equipment, comprising:

frame means;

support means mounted on said frame means adapted for securing said frame means against a wall, said support means being adapted to extend laterally, wherein said frame means may be displaced outwardly from said wall to a location above a disposal location;

a generally horizontal countertop mounted on said frame means adapted for a placement and retention of an ostomy bag thereon during cleaning of said ostomy bag, said countertop having a sink formed therein for draining liquid and waste materials from said ostomy bag and from said countertop; a mirror moujnted upright on said frame means;



a light source mounted to said frame means for illuminating said countertop, a user and said mirror; and

a drainage conduit, having a first end connected to said sink, said drainage conduit being adapted for carrying said waste materials and said liquid from said sink to said disposal location.

4,995,411

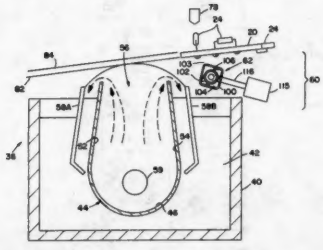
MASS SOLDERING SYSTEM PROVIDING AN IMPROVED FLUID BLAST

Charles R. Lowell, Concord, Mass., and Janet R. Sterritt, Hollis, N.H., assignors to Hollis Automation, Inc., Nashua, N.H.

Continuation-in-part of Ser. No. 254,712, Oct. 7, 1988, abandoned. This application May 11, 1989, Ser. No. 350,544

Int. Cl.[5] B08B *3/02*

U.S. Cl. 134—198 **1 Claim**



1. In a wash system for cleaning residual flux from a soldered printed circuit board having surface mounted circuit elements, conveyor means for moving said circuit board past a liquid nozzle for providing a high velocity sheet of liquid of substantially uniform velocity, density and volume extending in a predetermined direction and arranged to impact a circuit board to be treated by said sheet of liquid as said circuit board is moved past said nozzle, said nozzle comprising an outer tube having an elongated slot along one side thereof from which said sheet of fluid is emitted, an inner generally round tube mounted within said outer tube supplying high pressure fluid to said outer tube, said inner tube having an inlet at one end and being closed at the other end, a plurality of fluid vent holes in said inner tube communicating with said outer tube, said vent holes being spaced at least 90° around said inner tube from the position of the slot, the improvement wherein the outer tube is generally square and the elongated slot is along one edge thereof and the vent holes are all of substantially the same size and are positioned more closely together adjacent the inlet end of said inner tube than further along said inner tube.

4,995,412

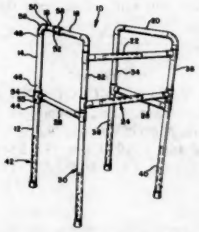
COMBINATION WALKER/CANE/QUAD CANE

Doris D. Hirn, 5747 N. Sheridan, Chicago, Ill. 60660-4755; Joyce R. Boin, 1524 Adhland Ave., Park Ridge, Ill. 60068, and Susan L. Breakwell, 2240 W. Farwell, Chicago, Ill. 60645

Filed Sep. 7, 1989, Ser. No. 404,277

Int. Cl.[5] A61H *3/00*

U.S. Cl. 135—67 **9 Claims**



1. A walker-forming frame, part of which is convertible into a cane, for aiding the movement of an invalid or other infirm person, comprising:

(a) a right and a left rigid frame section, each of said sections having front and rear vertical leg-forming element means interconnected at their upper end portions by a horizontally extending element means forming a gripping bar for the walker, the front vertical element means of said sections being interconnected by horizontally extending element means and the rear vertical elements being unconnected to form an unobstructed opening into the space between said right and left frame sections, at least one of said vertical element means including a relatively short horizontal portion at the upper end portion thereof, which horizontal portion has a sufficient length to form a readily graspable handle and;

(b) junction means for removably securing said at least one vertical element means to the rest of the frame to form a cane when removed therefrom.

4,995,413

COKE DRUM INLET LINE ALIGNMENT DEVICE

Daniel L. Torres, Bellingham; Darryl C. Gullikson, Custer; M. Bruce Case, and Ralph A. Neher, both of Bellingham, all of Wash., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 15, 1989, Ser. No. 451,401

Int. Cl.[5] B65G *67/00*

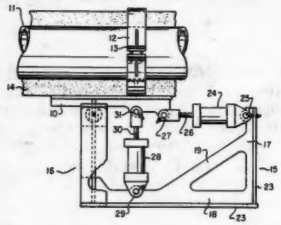
U.S. Cl. 137—1 **14 Claims**

1. A method for moving a first line having a first end flange to a second line having a second end flange, wherein said first line is movable in mutually orthogonal x, y and z directions and said second line is substantially immovable, said method comprising:

actuating means for moving said first line in a first of said x, y and z directions so as to decrease distance between said first end flange and said second end flange in said first direction;

actuating means for moving said first line in a second of said x, y and z directions so as to decrease distance between said first end flange and said second end flange in said second direction; and

actuating means for moving said first line in a third of said x, y and z directions so as to decrease distance between said



first end flange and said second end flange in said third direction.

4,995,414

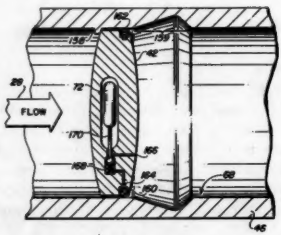
BUTTERFLY VALVE METHOD AND APPARATUS

John N. Tervo, Scottsdale, Ariz., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Jun. 6, 1990, Ser. No. 534,052

Int. Cl.[5] F16K *1/22*

U.S. Cl. 137—1 **4 Claims**



1. In a balanced-torque butterfly valve having a valve plate which is pivotally disposed in an elongate flow path defined by a duct, wherein the valve plate is pivotal from a first rotational position closing fluid communication along the path to a second rotational position maximally permitting fluid communication along the path, wherein the valve plate at the first rotational position separates a high-pressure, upstream region of the flow path from a lower-pressure, downstream region of the flow path, wherein the valve plate comprises a peripherally-disposed seal which cooperates with the duct to close fluid communication at the first rotational position, and wherein the seal at the first rotational position is subjected to peripherally outward pressure exerted thereon by pressurized fluid, a method for opening the valve comprising the steps of:

first, effecting a slight translational movement of the valve plate at the first position and in a direction substantially parallel to the plate, whereby the peripherally outward pressure exerted on the seal is decreased; and

second, rotating the valve plate away from the first position and toward the second position to open the valve.

4,995,415

PARTIALLY FLOODED GAS APPLIANCE SAFETY SHUT-OFF METHOD AND APPARATUS

Harold J. Weber, 313 Washington St., Holliston, Mass. 01746

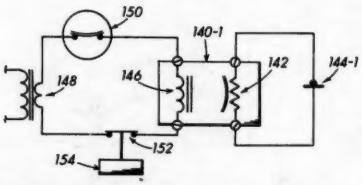
Filed Mar. 9, 1989, Ser. No. 320,998

Int. Cl.[5] F16K *17/36*; F22B *37/46*

U.S. Cl. 137—1 **20 Claims**

1. Safety method for gas burner apparatus having a pilot light means and a thermocouple means mounted at a level substantially above the level of gas flow path path produced by any main gas jet means whereby the main gas jet means is protected from improperly injecting gas into any surrounding environment when the burner apparatus is partially flooded by water through the steps of:

predetermining a critical level for any condition of water flooding where the water level is sufficient to interfere with the gas flow path produced by the main gas jet means



while the water level is substantially less than a level where it may extinguish the pilot light flame;

sensing the presence of any surrounding floodwater level when it has reached at least the predetermined critical level; and,

stopping any flow of gas to the main jet means when at least the critical level of floodwater has been sensed.

4,995,416

PROCESS FOR CONTROLLING THE MEDIUM INLET INTO AT LEAST ONE LEAKAGE CAVITY OF A VALVE AND AN APPARATUS FOR ITS PERFORMANCE

Hans O. Mieth, Sandkrug 3,, D-2058 Schnakenbek, Fed. Rep. of Germany

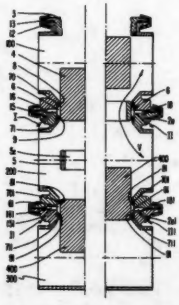
PCT No. PCT/EP89/00045, § 371 Date Aug. 31, 1989, § 102(e) Date Aug. 31, 1989, PCT Pub. No. WO89/06764, PCT Pub. Date Jul. 27, 1989

PCT Filed Jan. 17, 1989, Ser. No. 399,462

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1988, 3801569

Int. Cl.[5] F16K *3/00, 11/065, 51/00*

U.S. Cl. 137—1 **16 Claims**



16. A method for controlling a valve comprising

a casing including a first end casing part, a middle casing part, and a second end casing part arranged in series, said casing defining an inner space;

first sealing means for providing a seal between said first end casing part and said middle casing part, and second sealing means for providing a seal between said middle casing part and said second end casing part, at least one of said first and second sealing means comprising two seals disposed in series;

at least one leakage cavity in the inner space of said casing, said cavity being connected with the environment of the valve between the two seals of one of said first and second sealing means;

closing means engageable with said first sealing means for placing said middle casing part out of communication with said first end casing part and simultaneously engageable with said second sealing means for placing said middle casing part out of communication with said second end casing part, said closing means comprising at least one closing member; and

shutter means selectively engageable with either one of said first and second sealing means for providing fluid communication between a selective adjacent pair of said casing parts, said shutter means comprising at least one shutter member having a through passage, said shutter member selectively engaging one of said first and second sealing means to thereby provide said fluid communication between one of said pairs of adjacent casing parts, and said closing means selectively engaging the other of said first and second sealing means to block fluid communication between the other of said pair of adjacent casing parts, said closing means and said shutter means comprising means for selectively isolating said leakage cavity from the remainder of the inner space of said casing;

said method comprising:

moving said closing member between a first position in engagement with said first sealing means and a second position out of engagement with sealing means; and

moving said shutter element into engagement with said first sealing means when said closing member is in said second position.

4,995,417

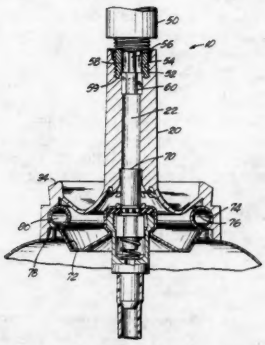
ONE-PIECE TIRE VALVE ADAPTOR

Virgil Naku, Hawthorne, N.Y., assignor to Precision Valve Corporation, Yonkers, N.Y.

Filed Apr. 2, 1990, Ser. No. 503,231

Int. Cl.[5] F16K *15/20*

U.S. Cl. 137—231 **30 Claims**



1. A one piece tire valve adaptor for connection to an aerosol container comprising;

a base including a means for attachment to a mounting cup; and

a hollow tube having a first end connected to said base, a second end comprising a spout for connection to a tire valve, and a flow passage extending from said first end to said second end;

said spout including a sealing means comprising a circumferential inner wall for engaging a threaded portion of the tire valve, an annular lower wall attached essentially perpendicular to said inner wall for engaging the end of the tire valve and an opposing wall attached to said lower wall, essentially parallel to said inner wall, said opposing wall being at least partially transverse to said inner wall, for engaging the inner surface of the threaded portion of the tire valve.

4,995,418

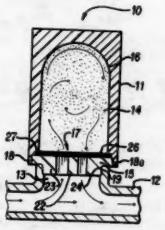
FERTILIZER SPRINKLER APPARATUS

William F. Cervola, 6856 Espanita St., Long Beach, Calif. 90815

Filed Oct. 18, 1989, Ser. No. 423,226

Int. Cl.[5] B05B *7/14*; B01D *11/02*

U.S. Cl. 137—268 **1 Claim**



1. An apparatus for the doping of water with fertilizer comprising:

a fertilizer chamber having an inner surface and an outer surface,

said inner surface being substantially cylindrical,

said inner surface having an open end,

said inner surface meeting with said outer surface at said open end,

said inner surface having a threaded surface at said open end,

said threaded surface being removably engagable with a chamber cap,

said chamber cap defining two openings therethrough,

said chamber cap being cylindrical in shape and having a threaded edge,

said threaded edge threadably engaging with said threaded surface of said open end of said inner surface of said fertilizer chamber,

said chamber cap having a threaded cylindrical element protruding therefrom,

a water conduit,

said threaded cylindrical element of said chamber cap threadably engaging said water conduit, and

a noncorrosive screen juxtaposed between said chamber cap and said fertilizer chamber preventing the fertilizer contained within said fertilizer chamber from exiting from said openings;

wherein said threaded surface at said open end of said fertilizer chamber and said threaded edge of said chamber cap oppose the orientation of the threads of said threaded cylindrical element protruding from said chamber cap.

4,995,419

MIXING VALVE FOR SINGLE-LEVER FAUCET

Manfred Pawelzik, Soest, and Horst Titze, Hagen, both of Fed. Rep. of Germany, assignors to Friedrich Grohe Armaturenfabrik GmbH & Co., Hemer, Fed. Rep. of Germany

Filed Jan. 22, 1990, Ser. No. 467,985

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1989, 3903998

Int. Cl.[5] F16K *11/02*

U.S. Cl. 137—316 **4 Claims**

1. In a single-control mixing valve comprising:

a housing generally centered on an axis and having an open end;

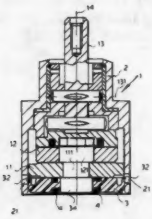
a base plate closing the open end, formed with inlet and outlet passages, and formed around the passages with grooves;

respective seals seated in the grooves;

a control plate formed with a crossflow cavity and displace-

able in the housing to interconnect the passages of the base plate; and

a lever pivoted on the control plate for displacing same, the improvement comprising



means including a plurality of outwardly directed barbs formed on an edge of the base plate and inwardly open axially elongated recesses receiving the barbs and formed on the housing for securing the base plate in the housing for only limited axial movement therein, and

formations pinching the seals in the grooves.

4,995,420

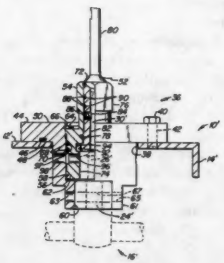
GLOVE BOX VALVE SYSTEM

Rodney K. Wiggins, Danville, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Aug. 10, 1990, Ser. No. 565,526

Int. Cl.[5] F16K *31/46*

U.S. Cl. 137—360 **7 Claims**



1. A valve system for a hermetically-sealed container having walls and a valve within said container comprising:

a face plate means mounted over an opening in one of said walls, said face plate means having a body portion thereof projecting through said opening and adapted to restrain rotation of a valve body of said valve in said container;

a packing tightener means sealingly rotatable within said face plate means and adapted to be manipulated outside said container to impart rotation to a packing nut rotatably mounted on said valve body to thereby tighten packing in said valve; and,

a valve stem turner means sealingly rotatable within said packing tightener means and adapted to be manipulated outside said container to impart rotation to a valve stem rotatably mounted in said valve to thereby control the opening and closing of said valve.

4,995,421

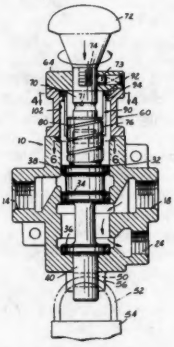
LOCK-OUT VALVE WITH CONTROLLED RESTART

Dennis L. Bonacorsi, Howell; Donald E. McGeachy, Milford, and Alan L. Smith, Livonia, all of Mich., assignors to Numatics, Incorporated, Highland, Mich.

Continuation-in-part of Ser. No. 405,964, Sep. 12, 1989, abandoned. This application Jan. 9, 1990, Ser. No. 462,591

Int. Cl.[5] F15B *13/04, 13/01*

U.S. Cl. 137—383 **6 Claims**



1. A fluid control valve comprising:

(a) a valve housing having a pressure port, an operational port and an exhaust port,

(b) a valve movable to connect a pressure port to said operational port in a first position and to connect said operational port to said exhaust port in a second position,

(c) manually operable means to shift said valve respectively to said two positions, and

(d) means associated with said valve and said manually operable means to effect rapid axial movement of said valve from said first position to said second position and to restrict movement of said valve from said second position to said first position.

4,995,422

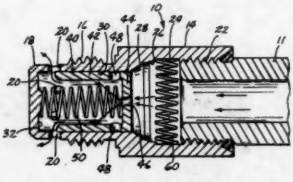
FLOW CONTROL VALVE

Timmy L. Chew, Council Bluffs, Iowa, and Glen Brand, Omaha, Nebr., assignors to Brand Hydraulics Co. Inc., Omaha, Nebr.

Filed Nov. 13, 1989, Ser. No. 434,191

Int. Cl.[5] G05D *7/01*

U.S. Cl. 137—504 **10 Claims**



1. A pressure compensated flow control valve for use in combination with a hydraulic fitting having female threads wherein the flow control valve comprises:

an elongated body member having an axial bore extending through said body member to a point near a closed end, said body member having a radially aligned port formed therein in the vicinity of said closed end and male threads formed upstream of said radially aligned port wherein said male threads will operatively engage the female threads on said hydraulic fitting;

a cylindrical spool including an open tubular skirting and an end plate having an orifice sized to allow flow of a fluid at a predetermined flow rate, said skirting being disposed in mating relationship with said axial bore with said end plate being directed away from said closed end, said spool being movable between a controlled flow position wherein the skirting extends over a portion of the radially aligned port and a reverse flow position wherein the radially aligned port is unobstructed;

means for biasing said spool away from said closed end; and

means for retaining said spool within the axial bore wherein said retaining means includes a stop attached to said body member and disposed to engage the end plate when said spool is in the reverse flow position and wherein said stop is a compression spring having opposite ends disposed to engage portions of an annular recess formed in said body member.

4,995,423

VALVE AND ARRANGEMENT FOR FIRE SUPPRESSION WATER SPRINKLER SYSTEM

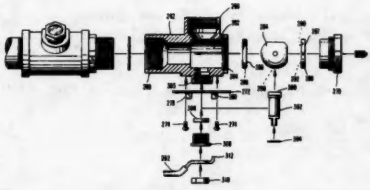
George J. McHugh, Broomall, Pa., assignor to AGF Manufacturing, Inc., West Chester, Pa.

Continuation-in-part of Ser. No. 138,436, Dec. 28, 1987, Pat. No. 4,832,610, which is a continuation-in-part of Ser. No. 881,270, Jul. 2, 1986, Pat. No. 4,741,361, which is a continuation-in-part of Ser. No. 874,653, Jun. 16, 1986, abandoned. This application Mar. 8, 1989, Ser. No. 320,713

The portion of the term of this patent subsequent to May 3, 2005, has been disclaimed.

Int. Cl.[5] F16K *37/00*

U.S. Cl. 137—559 **54 Claims**



1. An arrangement for testing and draining a fire suppression water sprinkler system, comprising:

conduit means for supplying water to a plurality of sprinklers;

means for sensing a flow of water in said conduit means;

valve means provided downstream of said means for sensing and in communication with said conduit means, said valve means comprising

a housing defining an interior chamber having an inlet and an outlet, said inlet and outlet being generally perpendicular to one another,

a valve member provided within said interior chamber, the valve member having first, second and third ports arranged about a surface of the valve member, said valve member having a turning axis and said first, second and third ports including central axes which are generally perpendicular to one another, said first port having a size which is smaller than either of the second and third ports;

seat means for selectively sealingly receiving a surface of the valve member adjacent the outlet; and

means for selectively moving said valve member within said interior chamber whereby communication between said inlet and outlet may be sequentially closed, opened to a first preselected flow rate and then opened to a second preselected flow rate, said second preselected flow rate being greater than the first preselected flow rate.

4,995,424

DIRECTIONAL CONTROL VALVE

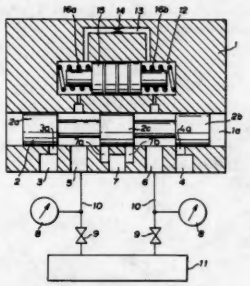
Hidenobu Ako, Ogaki, Japan, assignor to Teijin Seiki Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 326,884, Mar. 20, 1989, Pat. No. 4,913,191. This application Feb. 16, 1990, Ser. No. 480,844

The portion of the term of this patent subsequent to Apr. 3, 2007, has been disclaimed.

Int. Cl.[5] F15B *13/04*

U.S. Cl. 137—596 **2 Claims**



1. A directional control valve comprising a valve body having a sleeve formed therein, a spool slidable in said sleeve, two output ports, a pump port and two tank ports formed in said valve body, said ports and said spool arranged so that said output ports can operate at an output pressure or an exhaust pressure by operation of said spool, the directional control valve further comprising:

(a) a communicating passage formed in said valve body connecting said output ports with each other to permit a flow of fluid between said output ports;

(b) a fixed orifice disposed in said communicating passage;

(c) a control passage arranged in parallel with said communicating passage, in communication with said output ports; and

(d) a control spool disposed in said control passage, said control spool movable in response to a differential pressure between said output ports to block said communicating passage to provide a maximum output pressure.

4,995,425

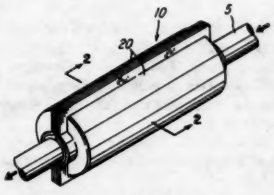
MAGNETIC FLUID CONDITIONER

Gale M. Weisenbarger, 140 Woodland Dr., Eaton, Ohio 45320, and John C. Moran, 3124 Lake Ave., Fort Wayne, Ind. 46805

Filed May 11, 1990, Ser. No. 522,091

Int. Cl.[5] F15C *1/04*

U.S. Cl. 137—827 **7 Claims**



1. A magnetic fluid conditioner for acting on a fluid being transmitted through a fluid transmitting conduit, said fluid conditioner comprising:

(a) a housing for externally abutting against a portion of said fluid conducting conduit, said housing having at least one elongated cavity therein to be substantially parallel with the longitudinal axis of said transmitting conduit;

(b) an elongated permanent bar magnet within each cavity of said housing positioned to be substantially parallel with the longitudinal axis of said fluid transmitting conduit; and,

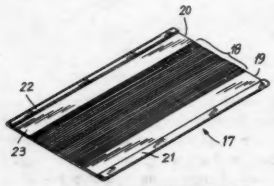
(c) a magnetic flux deflection shield within each cavity of said housing, each of said deflection shields being positioned between said permanent bar magnets and the outer wall of said cavities in said housing, each of said deflection shields being elongated with an arcuate transverse cross-section for deflecting a portion of the magnetic flux which would otherwise form flux paths outside of said magnetic fluid conditioner and deflecting said flux in the direction of said fluid transmitting conduit.

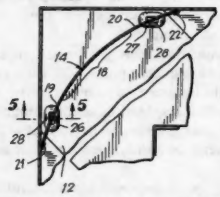
4,995,426

STOCK MATERIAL FOR FORMING AIR TURNING VANES AND AIR GUIDE DEVICES

Milton Hinden, Rte. #110, Farmingdale, N.Y. 11735

Filed Oct. 17, 1988, Ser. No. 258,493
Int. Cl.[5] F15D *1/04*; B32B *3/24*
U.S. Cl. 138—39 **7 Claims**





1. As a new article of manufacture, a coil of stock material for the fabrication of air turning vanes comprising, in combination, a coiled elongate band of sheet metal, the edge portions of said band being bent through an angle of 180° and flattened against a first surface of said band thereby to define double thickness margins of said band, said band including a central portion having longitudinally directed striations defining a weakened bend area, the transverse extend of said striated central portion being at least about one half of the transverse dimension of said band, said band including areas free of striations between said margins and said central portion.

4,995,427

PIPE SECTION, ESPECIALLY FOR ABRASIVE AND/OR CORROSIVE MATERIAL PIPELINES

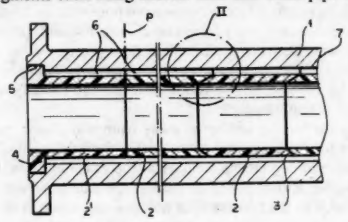
Rütger Berchem, Essen, Fed. Rep. of Germany, assignor to Metalpraecis Berchem & Schaberg Gesellschaft für Metallformgebung mit beschraänkter Haftung, Gelsenkirchen, Fed. Rep. of Germany

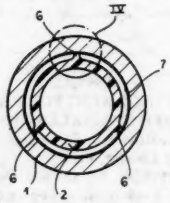
Filed Jun. 22, 1989, Ser. No. 369,993
Claims priority, application Fed. Rep. of Germany, Jun. 30, 1988, 3821985
Int. Cl.[5] F16L *19/02, 9/22*
U.S. Cl. 138—155 **10 Claims**

1. A piping length, comprising:

an outer pipe section of metallic material having ends connectable in a pipeline; and

an inner lining extending substantially over the entire interior length of said outer pipe section and formed by a plurality of tubular lining segments disposed end to end in said outer pipe section, composed of a nonmetallic material and removably disposed in said outer pipe section, said segments each being shorter than said outer pipe section,





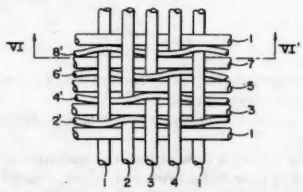
said segments including terminal segments at opposite ends of said lining formfittingly engaging and braced against respective ends of said outer pipe section.

4,995,428

PAPERMAKING FABRIC HAVING RECESSES ON PAPERMAKING SURFACE FILLED WITH AUXILIARY WEFTS

Takuo Tate; Taketoshi Watanabe, and Hiroyuki Nagura, all of Tokyo, Japan, assignors to Nippon Filcon Co., Ltd., Tokyo, Japan

Filed Aug. 29, 1989, Ser. No. 399,235
Claims priority, application Japan, Aug. 31, 1988, 63-215022
Int. Cl.[5] D03D *13/00*
U.S. Cl. 139—383 A **7 Claims**



1. A single-layer papermaking woven fabric having a paper side and a running side formed of warps and primary and auxiliary wefts and having more than three shafts in a repeating unit, said running side formed from long crimped primary wefts, where, in said repeating unit, at least one auxiliary weft having a smaller diameter than that of said primary weft is disposed between two adjacent primary wefts and each primary weft is disposed between two adjacent auxiliary wefts, each of said warps extending on the paper side over at least two primary wefts and over at least two auxiliary wefts, where each repeating unit has at least one warp extending from the paper side over one of the said adjacent primary wefts to the running side of a second of said adjacent primary wefts, or has at least one warp extending from the running side of one of said adjacent primary wefts to the paper side of a second adjacent primary weft, each of said auxiliary wefts being woven into said fabric at least once by a warp to be over at least one warp and under at least one adjacent warp in said repeating unit, whereby said auxiliary wefts are disposed in recesses which will otherwise make appearance on said paper

side at locations corresponding to the said warps extending from one of said paper side and said running side toward the other to thereby form a smooth paper side.

4,995,429

PAPER MACHINE FABRIC

Robert H. Kositzke, Appleton, Wis., assignor to Albany International Corp., Menands, N.Y.

Filed Feb. 5, 1986, Ser. No. 826,308
Int. Cl.[5] D03D *11/00, 15/00*
U.S. Cl. 139—383 R **8 Claims**

1. A papermaking machine fabric, which comprises:

an upper layer of interwoven first machine direction and first cross-machine direction yarns, said first yarns being of a synthetic, polymeric resin;

a lower layer of interwoven second machine direction and second cross-machine direction yarns, said second yarns being of a synthetic, polymeric resin;

the first machine direction yarns of the upper layer being in vertical alignment with the corresponding underlying second machine direction yarns of the lower layer; and/or

the first cross-machine direction yarns of the upper layer being in vertical alignment with the corresponding underlying second cross-machine direction yarns of the lower layer; and

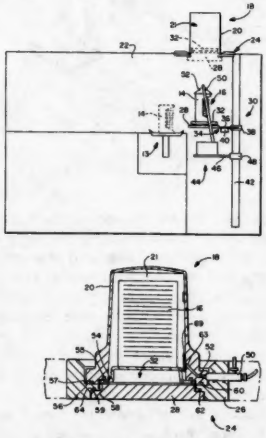
one of cross-machine direction binder yarns interwoven with the machine direction yarns in the upper and the lower layers at positions between the vertically aligned first and second machine direction yarns of the upper and the lower layers : said dryer fabric having a projected open area of at last about 30–55% of the total area of the fabric.

4,995,430

SEALABLE TRANSPORTABLE CONTAINER HAVING IMPROVED LATCH MECHANISM

Anthony C. Bonora, Menlo Park, and Frederick T. Rosenquist, Redwood City, both of Calif., assignors to Asyst Technologies, Inc., Milpitas, Calif.

Filed May 19, 1989, Ser. No. 354,027
Int. Cl.[5] B65B *1/04;* B05G *65/00*
U.S. Cl. 141—98 **12 Claims**



1. A sealable, transportable container, comprising:

a box having an interior region and a first sealing surface;

a box door having a peripheral edge and a second sealing surface adapted to mate with said first sealing surface when said box door is moved in a sealing direction; and

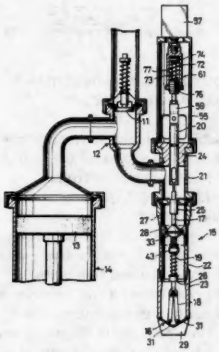
latch means for non-scraping motion in a first direction between a first position, which allows motion of said box door with respect to said box, and a second position, which limits the motion of said box door with respect to said box, and for non-scraping motion in a second direction between said second position and a third position, in which said latch means supports said box door at positions spaced from said peripheral edge of said box door to prevent said box door from deflecting, to move said box door in the sealing direction and to bring said first and second sealing surfaces into contact.

4,995,431

APPARATUS FOR FILLING SPECIFIED AMOUNT OF LIQUID

Shigeru Wakabayashi; Yoshihiro Saijo; Yoshitaka Yamane, and Yasuji Fujikawa, all of Tokushima, Japan, assignors to Shikoku Kakoki Co., Ltd., Tokushima, Japan

Filed Mar. 8, 1990, Ser. No. 490,247
Claims priority, application Japan, Mar. 24, 1989, 1-33489[U]
Int. Cl.[5] B67C *3/02*
U.S. Cl. 141—116 **5 Claims**



1. An apparatus for filling a specified amount of liquid comprising:

a vertical tubular filling nozzle;

an annular seat coupled to the vertical tubular filling nozzle, the seat facing downward and being formed on the inner surface of the filling nozzle approximately at the midportion of the height thereof;

a damper attached to the lower end of the filling nozzle and pivotally movable upward and downward, the damper being closeable when the damper is moved upward;

a vertical rod supported upwardly and downwardly movably inside the filling nozzle and extending through the seat inwardly thereof;

a connecting member connecting the free end of the damper to the lower end of the vertical rod;

a spring biasing the vertical rod upward to hold the damper closed against the gravity on the liquid within the filling nozzle;

a liquid channel blocking annular member slidably mounted on the vertical rod and biasing means for biasing said member upwardly with respect to said rod such that when the vertical rod is moved upward, an upper peripheral surface of the member comes into abutment with the downwardly facing seat whereby said blocking member closes said filling nozzle simultaneously when or immediately before the damper is closed; and

a metering cylinder for feeding the liquid to the filling nozzle in a volume at a time, the volume being greater than the volume of the liquid to be accommodated in the filling nozzle in the portion thereof under the blocking member.

4,995,432
DOSAGE EQUIPMENT

Jukka Tervamäki, Helsinki; Mauno Heinonen; Matti Priha, both of Vantaa, and Juha Koivisto, Helsinki, all of Finland, assignors to Labsystems Oy, Helsinki, Finland

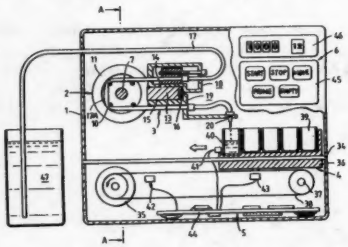
PCT No. PCT/FI88/00024, § 371 Date Oct. 13, 1988, § 102(e) Date Oct. 13, 1988, PCT Pub. No. WO88/06138, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 17, 1988, Ser. No. 265,876

Claims priority, application Finland, Feb. 20, 1987, 870733

Int. Cl.[5] F04B *43/12;* G01N *1/14*

U.S. Cl. 141—130 16 Claims



1. A dosage equipment for feeding liquid doses to a plurality of receiving vessels which comprises:

a frame **1**,

a peristaltic pump having a stationary part **2** including a stepping motor **11** mounted on said frame **1** and having a motor shaft **7** extending therefrom,

a body piece **12** spaced from said motor and fixed with respect to said frame **1**,

said shaft **7** being journalled to said body piece **12**,

said peristaltic pump having a two-part hose cassette **3** cooperatively associated therewith,

a pair of spaced end flanges **8** and **9** fixedly mounted on said shaft **7** between said motor and said body piece **12**,

a plurality of revolvable shafts **10** spaced about motor shaft **7**, each being journalled to said pair of spaced apart end flanges **8** and **9**

a counter-piece **13** mounted on said frame **1** and connected to said body piece **12** to fixedly secure said body piece with respect to motor shaft,

said counter-piece further being adapted to support said two-part hose cassette,

said two-part hose cassette **3** comprising cooperatively associated upper part **18** and a lower part **19** connected along adjacent sides thereof solely by unstretchable strands **33** such that the two parts **18**, **19** fit together about and are supported by said counter-piece **13**,

said counter-piece **13** including a free end and having means for engaging with locking means on said upper and lower parts **18**, **19** for cooperatively holding said upper and lower parts about said counter-piece **13**,

a plurality of spaced-apart elastic hoses **17** passing continuously through said upper and lower parts **18**, **19** and providing a loop **17A** thereof outside said upper and lower parts for passing around said revolvable shafts **10** in tension engagement therewith to compress said hose and maintain said upper and lower parts in contact with said counter-piece **13**,

a set of receiving vessels **39** arranged to receive dosed liquid therein,

each of said hoses **17** being connectable to a source of liquid to be dosed and having a nozzle **20** at one end for feeding dosed liquid to said receiving vessels **39**; and

a carriage **36** supporting said vessels **39** and displaceable relative to said peristaltic pump and located beneath said nozzles **20**.

4,995,433
FUEL DISPENSER SEAL

Bernd Beicht, Gross Umstadt OT Rischen; Joachim Heinemann, Weinheim; Frank Keller, Heddesheim, and Reinhard Tinz, Gross Biberau, all of Fed. Rep. of Germany, assignors to Firma Carl Freudenberg, Weinheim, Fed. Rep. of Germany

Filed Jul. 28, 1989, Ser. No. 387,014

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1988, 3829948

Int. Cl.[5] B65B *3/04*

U.S. Cl. 141—312 12 Claims

1. The combination of a fuel dispenser seal and an inlet of a fuel tank having an orifice of a reduced diameter comprising: an inlet of a fuel tank having an orifice of a reduced diameter and having a radial direction and an axial direction and having a projecting portion facing in the radial direction of the orifice inwardly of the orifice, a hollow, elongated support body, and a sealing ring made of a polymeric material which is provided with a sealing lip which can engage with a fuel dispenser, the sealing ring being held in the support body and at least a portion of the support body being elastically configured for insertion into the inlet through the orifice by means of an elastic diameter reduction and said inlet engaging the support body with the projecting portion of the inlet facing in the radial direction of the orifice inwardly of the orifice and the support body being firmly attached in the axial direction of the orifice.

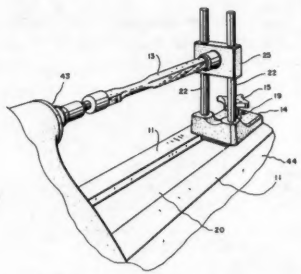
4,995,434
WOODWORKING LATHE TAILSTOCK ASSEMBLY

Clead M. Christiansen, 3086 N. 150 East, North Ogden, Utah 84414

Filed Aug. 8, 1989, Ser. No. 391,154

Int. Cl.[5] B27C *7/04, 7/06;* B23B *23/04, 43/02*

U.S. Cl. 142—48 5 Claims



1. A tailstock assembly for a wood-turning lathe, said lathe having a horizontal bed and a headstock assembly including a rotatable chuck for gripping the head end of a wooden spindle workpiece or the like, the tailstock assembly comprising:

a rotatable chuck adapted to retain the tail end of the workpiece and having a drill bit guide bore therethrough along its axis of rotation; and

means for securing the chuck selectively positioned along the bed with the axis of rotation of the chuck aligned with that of the headstock chuck; wherein

the lathe includes a pair of parallel horizontal ways and the selective position chuck securing means comprises:

releasable clamping means carried by the tailstock assembly for its attachment upstanding from the ways in selective longitudinal, lateral, and rotational positions thereon; wherein

the tailstock includes means for positioning the chuck upon the tailstock elevated at selective elevated at selective distances above the ways.

4,995,435

APPARATUS FOR AND METHOD OF CUTTING JOINTS

Christopher M. V. Godfrey, The Old School, Godney Wells, Somerset BA5 1RY, Great Britain

Filed Nov. 21, 1989, Ser. No. 439,633

Claims priority, application United Kingdom, May 22, 1987, 8712094; Feb. 12, 1988, 8803340

Int. Cl.[5] B27B *1/00*

U.S. Cl. 144—363 16 Claims

1. An apparatus for machining at least one half of an interconnecting joint between the end regions of two components, the apparatus comprising:

a support;

a carrier movable on and fixable with respect to the support and having a first clamping means, for clamping to the carrier a first component for machining of that component, and a second clamping means for clamping a second component, having a previously machined end profile, to the carrier in a predetermined position to act as a template to enable the end region of the first component to be machined to a profile capable of co-operating with the second component;

a cutting means mounted on the support for machining the end of the component; and

means defining a datum point;

the arrangement being such that, in use, when the second component is sequentially held by the second clamping means in a series of predetermined positions in relation to the means defining a datum point, the first component to be machined is correspondingly held in a series of positions in relation to the cutting means whereby the end of the first component is capable of being machined by the cutting means to a profile capable of co-operating with the profile of the second component.

4,995,436

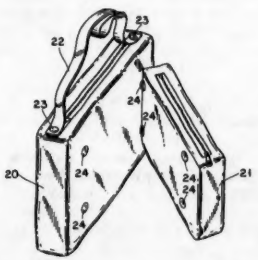
ANTI-THEFT HANDBAG

Joseph L. Cantor, 175 E. Mt. Pleasant Ave., Livingston, N.J. 07039

Filed Jun. 16, 1989, Ser. No. 368,412

Int. Cl.[5] A45C *1/02, 3/06, 13/18, 13/22*

U.S. Cl. 150—102 18 Claims



1. An anti-theft handbag device comprising two adjacent handbag segments, one handbag segment being larger than the other handbag segment and a means for detachably securing a side of the larger handbag segment to a side of the other handbag segment so that said means mate with each other in between the adjacent handbag segments wherein a cavity means is located between the adjacent handbag segments when they are joined together, said cavity means being capable of receiving and enveloping a hand of the holder of the anti-theft bag and said larger handbag segment having a carrying strap mounted thereon so that upon extraordinary pulling of either the carrying strap or the larger handbag segment, the carrying strap and larger handbag segment will separate along a generally horizontal direction from the other handbag segment.

4,995,437

HEAVY DUTY PNEUMATIC RADIAL TIRES INCLUDING A BENT GROOVE IN THE SIDE FACE OF THE TREAD

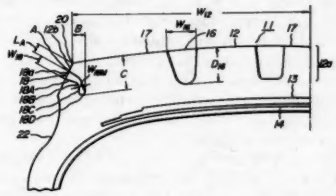
Yasutaka Enoki, Sayama; Shigeo Makino, Tokorozawa, and Shinji Murase, Kodaira, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Nov. 25, 1988, Ser. No. 275,999

Claims priority, application Japan, Nov. 25, 1987, 62-298036; Oct. 21, 1988, 63-266903

Int. Cl.[5] B60C *11/00, 13/02*

U.S. Cl. 152—209 R 18 Claims



10. A radial tire comprising; a tread portion having a ground contact portion with main grooves, a tread portion side face not in ground contact, a fine groove opening in said tread portion side face and extending in the peripheral direction of said tire, said fine groove in cross-section having a first segment directed inward from said tread portion side face and a second segment bent at an angle from said first segment such that centerlines of said first and second segments form to different angles relative to a circumferential plane of said tire.

4,995,438

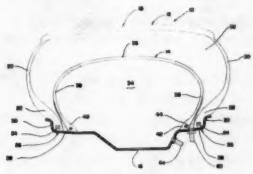
MULTI-CHAMBERED PNEUMATIC TIRE AND WHEEL ASSEMBLY HAVING AN INNER TIRE AND AN OUTER TIRE

Michael J. Weber, Akron, and Stuart D. Grant, Silver Lake, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Nov. 2, 1989, Ser. No. 430,469

Int. Cl.[5] B60C *17/01, 5/20*

U.S. Cl. 152—518 3 Claims



1. A tire and rim assembly comprising:

a rim having a pair of diametrically opposed annular bead seating portions, each bead seating portion having a ledge and a radially outwardly extending flange;

a tubeless pneumatic outer tire mounted on said rim having an inner cavity and a pair of axially opposed bead portions, each bead portion being disposed adjacent to a ledge and a respective flange of one of said beat seating portions of said rim;

a tubeless pneumatic inner tire disposed within said tire cavity, mounted on said rim, dividing said inner cavity into inner and outer chambers and, having first and second axially opposed bead portions, the first bead portion of the

inner tire being disposed adjacent to a ledge of one of said bead seating portions of the rim and the respective bead portion of the outer tire, and the second bead portion of the inner tire being disposed adjacent to the ledge of the other bead seating portion of the rim and is both disposed adjacent to and spaced from the respective bead portion of the outer tire to form a circumferentially extending air passageway, and said second bead portion of said inner tire having a radially inner end adjacent to the ledge of the respective bead seating portion and an axially outer portion located radially outwardly from the inner end adjacent said ledge and extends axially outwardly from said radially inner end to a protrusion tapering radially outwardly, said protrusion being adjacent to said bead portion of the outer tire and located radially outwardly of the ledge of the respective bead portion a distance in the range of from 30% to 80% of the height of the flange, and said protrusion having a radially extending groove therein to allow the passage of air to and from the air passageway to the outer chamber; and

an inflation valve carried by said rim for allowing the passage of air to and from the air passageway; and an inflation means carried by said rim for allowing the passage of air to and from the inner chamber.

4,995,439

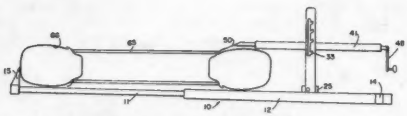
TIRE BEAD BREAKER

Leonard F. Burge, Sheoak - Lot 1, Plenty Road, Yan Yean, Victoria, Australia (3755), assignor to Leonard F. Burge and Elaine R. Burge, Yan Yean, Australia

Filed Jan. 24, 1990, Ser. No. 469,390

Int. Cl.[5] B60C *25/132*

U.S. Cl. 157—1.17 **20 Claims**



1. A tire bead breaker comprising:

a base upon which a wheel and tire is initially adapted to be located;

a stop attached at one end of the base to restrict outward movement of the wheel and tire;

an arm assembly having proximal and distal ends, wherein the proximal end of the arm is pivotally connected to the base at a desired position locatable on a side of the wheel and tire away from the stop near the other end of the base;

a breaker assembly having first and second telescopic members, the first telescopic member being pivotally connected on the arm assembly at a point near the distal end of the arm assembly, and the second telescopic member having proximal and distal ends, wherein a breaker plate is attached to the distal end of the second telescopic member; and

means for rotating the breaker assembly so that there is an inward and downward movement of the breaker plate to effect separation of the tire from a rim of the tire,

wherein the second telescopic member is slidable outwardly relative to the first telescopic member of the breaker assembly, to enable the breaker plate to be located between the tire and the rim, and wherein further having means for inducing relative movement between the breaker assembly and the stop such that the wheel and tire tend to rotate upwardly about the stop member.

4,995,440

ROLLING SHUTTER FOR WALL OR ROOF OPENINGS, ESPECIALLY IN CONNECTION WITH TURNABLE ROOF WINDOW

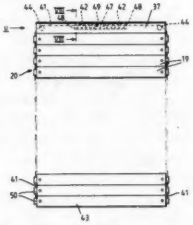
Franz Vorsmann, Marsberger Str. 14, 3538 Marsberg 4, Fed. Rep. of Germany

Filed Feb. 13, 1990, Ser. No. 479,354

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1989, 8901615[U]; Oct. 11, 1989, 8912065[U]

Int. Cl.[5] E06B *9/26*

U.S. Cl. 160—32 **25 Claims**



1. A rolling shutter for wall or roof openings, especially in connection with a turnable roof window, comprising a rolling shutter web composed of a plurality of rolling shutter elements pullable from one another for forming light gaps; a rolling shutter shaft for winding and unwinding of said rolling shutter web; supports for rotatably supporting said rolling shutter web; two parallel side walls connected with said supports for guiding lateral ends of said rolling shutter webs; an actuating device having a mechanism for an opening movement of the rolling shutter web and a pulling device engaging a free front end of said rolling shutter web and supporting or performing its closing movement, said rolling shutter elements including a front rolling shutter element and a rear rolling shutter element; a pulling rope connecting said front rolling shutter element and said rear shutter element, said pulling rope being fixedly connected with said rear rolling shutter element and being connected with said front rolling shutter element by means of a spring provided for closing of said light gaps, said spring having a force selected so that during starting an opening movement of said rolling shutter web at least said light gaps located between said front and rear rolling shutter elements are opened under the action of said pulling device and then said rolling shutter web is wound in an opening direction.

4,995,441

SECTIONAL DOORS AND FLEXIBLE HINGE ASSEMBLIES

Alan R. Leist, 1038 Jonquil Lane, Cincinnati, Ohio 45231; Thomas G. Mushaben, 5541 Bosworth Place, Apt. #4, Cincinnati, Ohio 45212, and Thomas E. Youtsey, 854 Lincoln Road, Bellevue, Ky. 41073

Filed May 1, 1989, Ser. No. 345,562

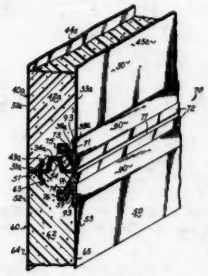
Int. Cl.[5] E06B *3/70*

U.S. Cl. 160—229.1 **15 Claims**

1. An elongated flexible hinge assembly for hingedly securing together abutting panel sections of a sectional door for articulation of the panel sections with respect to each other, each said panel section being formed with an elongated slot, said flexible hinge assembly comprises:

an elongated flexible hinge or generally V-shape cross-section when inserted in the elongated slots of the abutting panel sections and having an elongated central web comprised of an elastomer material which is substantially resistant to flexure fatigue, said elongated central web having an exterior side surface and an elongated area alongside the exterior side surface for flexing thereat, said elongated central web further having first and second ends wherein each said end is connected to an elongated

flange, said flanges being spaced apart from one another, one said flange being adapted to be inserted into one said elongated slot of one said abutting panel section and said other flange being adapted to be inserted into said other elongated slot of said other abutting panel section for hingedly connecting said abutting panel sections to one another in an abutting relationship, said elongated central web further having a pair of elongated receiving means extending along the exterior side surface and being spaced from each other;



two elongated retainer slats for said elongated flexible hinge, each said retainer slat having first and second elongated edges, each said first elongated edge of each said retainer slat being adapted to be inserted into one said elongated slot of one said abutting panel section in contact with said flange therein and each said second elongated edge of each said retainer slat being received by one said elongated receiving means along the exterior side surface of said elongated central web for locking said elongated flexible hinge in said elongated slots of said abutting panel sections.

4,995,442

CURTAIN OPENING DEVICE

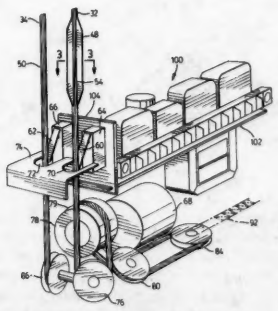
Stanley E. Marzec, 14 Rusholme Drive, Apt. 3, Toronto, Ontario, Canada M6J 3G9

Continuation-in-part of Ser. No. 365,151, Jun. 12, 1989, abandoned. This application Mar. 5, 1990, Ser. No. 489,119

Claims priority, application Canada, Jun. 10, 1988, 569146

Int. Cl.[5] A47H *5/02*

U.S. Cl. 160—331 **16 Claims**



1. A device for opening and closing at least one closure member, a cord being associated with the closure member and having a bight portion located in a first plane and a pair of substantially parallel, spaced first and second reaches located in a second plane spaced from said first plane, the device comprising a drive roller for driving engagement with the bight portion, reversible electric motor means for driving the drive roller, the diameter of the drive roller being larger than the spacing between the parallel reaches, and first and second pulleys between the reaches and the bight to allow a change in direction of the cord between the reaches and bight, at least a first pulley being rotatable about an axis skewed relative to the first and second planes.

4,995,443

PROCESS FOR EVAPORATIVE PATTERN CASTING

Jay Easwaran, Portage, Mich., assignor to The Board of Trustees of Western Michigan University, Kalamazoo, Mich.

Filed Feb. 8, 1989, Ser. No. 308,313

Int. Cl.[5] B22C *9/02*

U.S. Cl. 164—34 **21 Claims**

19. A method for producing a cast metal part comprising the steps of forming a pattern of the metal part out of a polymeric material; applying 2–5 ceramic coatings to said pattern and drying each ceramic coating prior to the application of a subsequent ceramic coating to form a ceramic shell containing said pattern; applying a fused silica coating to each ceramic coating prior to said drying of said each ceramic coating; introducing said ceramic shell into a bed of fluidized sand at a temperature of about 1500°–2000° F.; compacting said fluidized sand around said ceramic shell; decomposing said pattern to form a mold; introducing molten metal into said mold without removing said mold from said compacted sand; solidifying said molten metal; and removing said solidified molten metal from said mold to form a cast metal part.

4,995,444

METHOD FOR PRODUCING METAL OR ALLOY CASTING COMPOSITES REINFORCED WITH FIBROUS OR PARTICULATE MATERIALS

Mark Jolly, Vessy; Guy Negaty-Hindi, Onex, and Georges Haour, Geneva, all of Switzerland, assignors to Battelle Memorial Institute, Geneva, Switzerland

Continuation of Ser. No. 162,257, Feb. 29, 1988, abandoned. This application Jun. 8, 1990, Ser. No. 535,986

Claims priority, application European Pat. Off., Mar. 2, 1987, 87810114.6

Int. Cl.[5] B22D *19/14*

U.S. Cl. 164—97 **19 Claims**

1. A method for producing metal or alloy casting composites, consisting essentially of a metal matrix reinforced with fibers or particles of reinforcing material distributed in this matrix according to a desired pattern, which comprises the steps of:

(a) providing a self-supporting template preform structure having no to little reinforcing properties, made of a porous body or of a network of cross-linked building constituents containing particles or fibers of reinforcing material distributed in pores or in voids between said constituents of the structure and binding said particles or fibers of reinforcing material according to a desired pattern, to said constituents of said preform structure by adding a binder substance;

(b) introducing said preform structure into a casting mould or die, filling said mould or die with a molten metal or alloy and causing said molten metal or alloy to infiltrate interstices in the preform structure and thus embed said particles or fibers within the metal to form a matrix of a casting composite; and

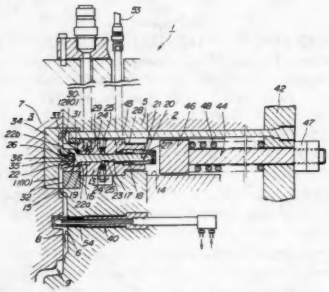
(c) allowing the molten metal or alloy to solidify, and separating the resulting solidified casting composite from the mould.

4,995,445

GAS VENT SYSTEM OF A MOLD

Masatomo Shigyo, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Feb. 20, 1990, Ser. No. 481,368
Claims priority, application Japan, Feb. 20, 1989, 64-39560
Int. Cl.[5] B22D *17/20*
U.S. Cl. 164—305 17 Claims



1. A gas vent system of a mold, comprising:

a gas vent passageway formed on mating surfaces of a pair of mold halves and communicating a mold cavity with the outside of a mold when the mold is closed; and

a gas vent valve mounted on one of the mold halves and disposed intersecting in a direction substantially perpendicular to the gas vent passageway so as to block the gas vent passageway in response to a pressure from a molten material forced into the mold cavity;

wherein the gas vent valve is provide don its end surface receiving the pressure from the molten material with a concave portion opening toward the other of the mold halves;

a projection is formed on the other of the mold halves and disposed so as to be fitted tightly in the concave portion of the gas vent valve when the mold is fastened; and

the projection is provided with part of the gas vent passageway, which is directed toward the concave portion of the gas vent valve so as to pass gases therethrough from the mold cavity to the concave portion of the gas vent valve.

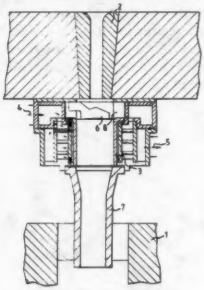
4,995,446

DEVICE FOR COOLING A METAL DURING CASTINGS

Paul Naveau, Alleur, and Stephan Wilmotte, Chaudfontaine, both of Belgium, assignors to Centre De Recherches Metallurgigues, Centrum Voor Research In Demetallurgie, Fed. Rep. of Germany

Filed Feb. 3, 1989, Ser. No. 306,320
Claims priority, application Belgium, Feb. 3, 1988, 08800130
Int. Cl.[5] B22D *11/00*
U.S. Cl. 164—437 4 Claims

1. In a continuous casting assembly of the type including a dispenser and a mold, a device intermediate said dispenser and mold for cooling a metal during casting having a vertical duct and means for distributing metal over the inner surface of the vertical duct and disposed substantially at the inlet thereof, the improvement comprising a supply chamber disposed around the vertical duct and having a front wall which at a spacing intimately follows the shape of the vertical duct, an evacuation chamber disposed around the supply chamber, an intermediate wall separating the evacuation chamber from the supply chamber, a rear wall surrounding the evacuation chamber, the front wall having a plurality of first and second passages therethrough, said first and second passages each including passages disposed in a plurality of locations spaced about said duct as well as a plurality of locations spaced along said duct intermediate the opposite ends thereof, said first passages each having an end opening toward the vertical duct, and another end opening into the supply chamber, said second passages each having a tube connected to one end thereof,the tubes extending through the supply chamber and the intermediate wall and



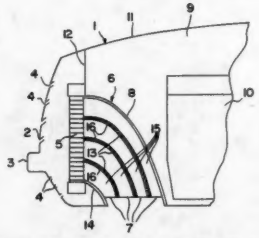
opening into the evacuation chambers, means for supplying cooling liquid to the supply chamber, and means for evacuating the cooling liquid from the evacuation chamber.

4,995,447

AIR DUCTING SYSTEM FOR COOLING AIR IN THE FRONT END OF A MOTOR VEHICLE

Werner Weidmann, Weinstadt, and Rainer Tiefenbacher, Leinfelden-Echterdingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany

Filed May 17, 1990, Ser. No. 524,423
Claims priority, application Fed. Rep. of Germany, May 26, 1989, 3917108
Int. Cl.[5] B60H *3/00;* B61D *27/00;* B60K *11/02*
U.S. Cl. 165—44 10 Claims



1. Air ducting system for cooling air in an air duct in a front end of a motor vehicle, which duct is arranged in front of at least one wall defining a capsule surrounding an engine compartment in the direction of travel of the motor vehicle and has an essentially vertically positioned air inlet opening at a forward front end wall and an essentially horizontally positioned air outlet opening at an underside of the front end, wherein a plurality of aerodynamically shaped guide vanes divide the air duct into a plurality of sub-ducts, said guide vanes being arranged in the air duct to extend as far as the air outlet opening at the underside of the front end, and wherein the guide vanes are of hollow design and are flowed through by a cooling medium transversely to the direction of flow of the cooling air.

4,995,448

ENGINE OIL COOLING SYSTEM

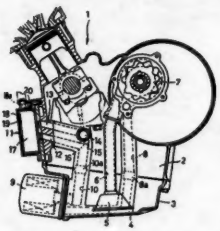
Takashi Inagaki; Tokuji Yoshimoto; Michio Okubo; Kouji Okazaki, and Tsugio Ikeda, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 149,586, Jan. 28, 1988, abandoned. This application Aug. 29, 1989, Ser. No. 401,473

Claims priority, application Japan, Feb. 6, 1987, 62-024742; Mar. 13, 1987, 62-056701

Int. Cl.[5] F01P *11/08;* B62D *61/02;* B61D *27/00*

U.S. Cl. 165—44 6 Claims



5. A system for cooling engine oil in a vehicle engine comprising:

a cooler operative to transfer heat from said engine oil to a cooling fluid;

wall means on said vehicle engine forming an oil collection reservoir having a front wall fixedly connecting said cooler on a forwardly facing surface on the front wall thereof for exposure to air flowing during vehicle movement whereby said cooling fluid comprises said flowing air;

means for supplying engine oil to said cooler including inlet and outlet passages extending through said vehicle engine wall means and communicating with said cooler and an upstanding flow conductor positioned interiorly of said engine, an orifice in said flow conductor dividing the interior thereof into an oil inlet portion and an oil outlet portion, and oil flow pipes extending between said wall means and said flow conductor for connecting said oil inlet portion of said conductor to said cooler inlet passage and said oil outlet portion of said conductor to said cooler outlet passage; and

said oil flow passages are disposed in mutually divergent relation between said flow conductor and said wall means.

4,995,449

RAPID ACTION COUPLING SYSTEM FOR A HEAT EXCHANGER FLUID TANK INTEGRAL WITH AN EXPANSION VESSEL

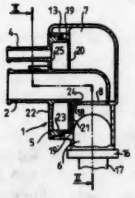
Christophe Renault, Le Chesnay, France, assignor to Valeo Thermique Moteur Hutchinson, Paris, France

Filed Oct. 13, 1989, Ser. No. 421,080

Claims priority, application France, Oct. 13, 1988, 88 13489

Int. Cl.[5] F28F *9/00;* F16L *39/02*

U.S. Cl. 165—76 12 Claims



1. A rapid action coupling system for simultaneous coupling to an external circuit of a fluid inlet chamber and a fluid outlet chamber (10, 11) made in the same heat exchanger fluid tank and separated from one another by a partition (12), the system including adjacent inlet and outlet openings (8), for the two chambers which are provided in the fluid tank, and a coupling device (1) cast en bloc which is provided with at least two fluid passages (2, 3) and is arranged to be attached to the fluid tank in such a way that these two fluid passages communicate respectively with the two openings in the fluid tank, characterized in that the openings are made in a wall portion (18) separating the fluid tank from an expansion vessel (7) formed in a single piece with it and the internal volume of which is adjacent to the two chambers, and that the coupling device penetrates into the expansion vessel.

4,995,450

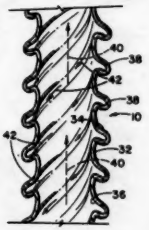
HEAT PIPE

Elmo W. Geppelt, and William H. Poore, both of Tulsa, Okla., assignors to G.P. Industries, Inc.

Filed Aug. 18, 1989, Ser. No. 395,581

Int. Cl.[5] F28D *15/02*

U.S. Cl. 165—104.21 2 Claims



1. A heat pipe for transferring heat from a heat sink, such as the earth, to a separate medium comprising:

an elongated tube having a first and a second end, and being closed at each end and having a heat absorption portion adjacent the first end and a heat dissipation portion adjacent the second end, the tube having a wall with an internal surface and an external surface and the wall of the tube having an internal spiraled groove therein providing a spiraled valley and a spiraled ridge in both the interior and exterior surfaces, the heat dissipation portion of the tube being elevationally above the heat absorption portion, the spiraled valley and ridge defining a trough having opposed wall portions that, in a plane of the tube longitudinal axis, are of height greater than the portion between the wall portions providing a spiraled fluid carrying trough on the wall internal surface extending from said heat absorption portion to said heat dissipation portion; and

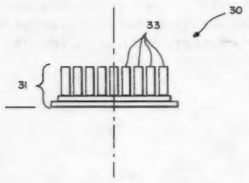
a refrigerant within said tube having a liquid and a vapor phase and wherein at least a portion of the refrigerant liquid is convertible to vapor in the heat absorption portion and wherein at least a portion of the vapor is convertible to liquid in the heat dissipation portion and wherein at least part of the liquid refrigerant is conducted from said heat dissipation portion to said heat absorption portion in said tube wall spiraled fluid carrying trough.

4,995,451

EVAPORATOR HAVING ETCHED FIBER NUCLEATION SITES AND METHOD OF FABRICATING SAME

William R. Hamburgen, Menlo Park, Calif., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Dec. 29, 1989, Ser. No. 458,909
Int. Cl.[5] H01L *23/427*
U.S. Cl. 165—104.33 10 Claims



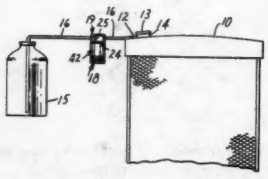
1. An evaporator apparatus, comprising a reservoir containing a fluid and a plurality of graphite-metal composite pin fins in said reservoir, said pin fins each having a plurality of nucleation sites thereon.

4,995,452

FILTER-CONDITIONER FOR MOTOR COOLING LIQUID

Gerald R. Franck, St. Paul, and David B. Olsen, Lake Elmo, both of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Continuation of Ser. No. 303,520, Sep. 18, 1981, Pat. No. 4,444,247, which is a continuation of Ser. No. 26,406, Apr. 2, 1979, abandoned. This application Aug. 10, 1983, Ser. No. 521,834
Int. Cl.[5] F28F *13/12*; F01P *3/22*
U.S. Cl. 165—119 5 Claims



3. In combination with an internal combustion engine cooling system having overflow port means permitting overflow of liquid engine coolant when the cooling system overheats, and providing suction as the cooling system cools, a filtering apparatus comprising:

filtering means for removing debris from engine coolant passing through the filtering means, including filter inlet means for receiving engine coolant to be filtered and filter outlet means for releasing filtered engine coolant;

a reservoir in fluid communication with the filter outlet means for receiving and containing the filtered engine coolant;

conduit means for placing each of the filter inlet means and the interior of the reservoir into fluid communication with the overflow port means to permit flow of engine coolant therebetween; and,

valve means for directing the flow of fluids through the conduit means so that in use

(a) engine coolant overflowing from the overflow port means is forced through the filter means into the reservoir and,

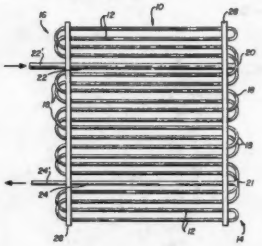
(b) the suction provided at the overflow port means when the cooling system cools draws filtered engine coolant from the reservoir.

4,995,453

MULTIPLE TUBE DIAMETER HEAT EXCHANGER CIRCUIT

Matthew T. Bartlett, Lexington, Ky., assignor to Signet Systems, Inc., Harrodsburg, Ky.

Filed Jul. 5, 1989, Ser. No. 375,593
Int. Cl.[5] F28D *1/047*; F25B *39/00*
U.S. Cl. 165—150 34 Claims



11. A heat exchanger assembly comprising:

a pair of header members;

a plurality of heat transfer tubes of substantially the same interior cross-sectional area extending between said header members;

a plurality of convective cooling fins forming an array over said heat transfer tubes, said heat transfer tubes and fins adapted to transfer heat between the exterior of said tubes and fins and a working fluid in a gaseous or liquid phase within said tubes; and

a pressure drop minimizing tube extending between said header members and within said heat transfer tube and fin array, said pressure drop minimizing tube have an interior cross-sectional area significantly larger than said heat transfer tubes and adapted to carry said working fluid in a gaseous phase as an inlet for said heat exchange assembly.

4,995,454

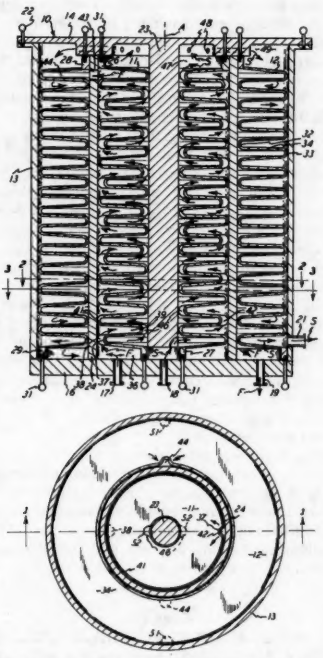
HEAT EXCHANGER WITH CORRUGATED TUBES

Donovan S. Thompson, 2727 Lincolnwood Dr., Racine, Wis. 53403

Filed Nov. 17, 1989, Ser. No. 438,309
Int. Cl.[5] F28D *7/10*
U.S. Cl. 165—155 18 Claims

14. In a heat exchanger of the type including a corrugated tube having a plurality of convolutions therealong with inner and outer diameters and with the exchanger arranged for the flow of two separated fluids respectively on the inside and the outside of said tube for the exchange of heat between said fluids, the improvement comprising partitions in respective contact with said inner and outer diameters of said convolutions and extending the length of said tube for respectively confining the flow of the fluids relative to the inner and outer diameters of said convolutions, flow openings spaced along said tube and said partitions, and therebetween, for the flow of

fluid through said openings and successively from each of said convolutions to a convolution adjacent said each convolution,



and said exchanger having fluid passageways for directing the flow of the fluids through said exchanger.

4,995,455

PLATE HEAT EXCHANGER WITH GLUELESS GASKETS

Achint P. Mathur, Wichita Falls, Tex., assignor to Tranter, Inc., Augusta, Ga.

Continuation-in-part of Ser. No. 375,190, Jul. 3, 1989, Pat. No. 4,905,758. This application Mar. 6, 1990, Ser. No. 489,227

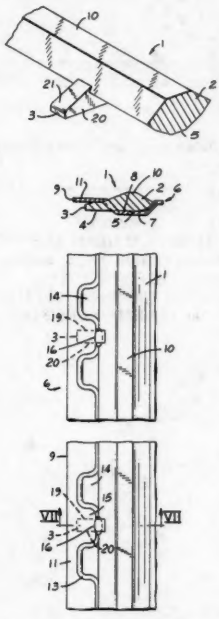
Int. Cl.[5] F28F *3/10*

U.S. Cl. 165—166 **20 Claims**

1. In combination, a heat exchanger plate having an elongated groove spaced inwardly from an edge of said plate and depressed downwardly relative to a marginal plate portion between said groove and said plate edge, said groove having a bottom wall and laterally spaced inner and outer side walls, a plurality of openings in said outer side wall, said openings being located entirely in said outer side wall and spaced apart longitudinally of said groove, a gasket of flexible, compressible material having an elongated main body portion seated in said groove, said gasket having tabs integral with said main body portion projecting into and through said openings, said tabs being elongated and projecting sufficiently beyond said openings so that they may be grasped by hand or by a tool from the side of said plate opposite the side in which said groove is formed and pulled completely through said openings to fully seat said main body portion of said gasket in said groove.

4. In combination, a heat exchanger plate having an elongated groove spaced inwardly from an edge of said plate and depressed downwardly relative to a marginal plate portion between said groove and said plate edge, said groove having a horizontal bottom wall and laterally spaced inner and outer side walls, a plurality of openings in said outer side wall, said openings being spaced apart longitudinally of said groove, a gasket of flexible, compressible material having an elongated main body portion seated in said groove, said gasket having tabs integral with said main body portion projecting into and through said openings, said tabs tapering laterally outwardly and having a wedging interference with opposite edges of said openings.

13. In combination, a heat exchanger plate having an elongated groove spaced inwardly from an edge of said plate and depressed downwardly relative to a marginal plate portion



between said groove and said plate edge, said groove having a bottom wall and laterally spaced upwardly and outwardly flaring inner and outer side walls, a plurality of openings in said outer side wall, said openings being spaced apart longitudinally of said groove, a gasket of flexible, compressible material having an elongated main body portion seated in said groove, said gasket having tabs integral with said main body portion projecting at least partially into said openings, said tabs each having a button on the outer end engaged under the upper edge of an opening.

4,995,456

GRAVEL PACK WELL COMPLETIONS

Holley M. Cornette, Plano, and Jean M. S. Weingarten, Frisco, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed May 4, 1990, Ser. No. 518,048

Int. Cl.[5] E21B *43/04*

U.S. Cl. 166—51 **2 Claims**

1. A gravel-pack completion assembly comprising:

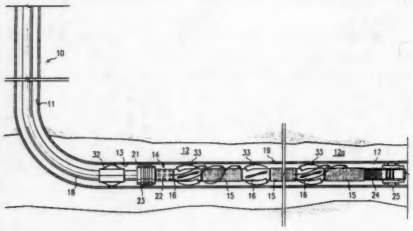
a body adapted to be connected at one end to the lower end of a well conduit;

a fluid-permeable liner connected to the other end of said body; and

a distributor means on said completion assembly for imparting spiral flow to any fluid flowing past said completion assembly when said completion assembly is in an operable position wherein said distributor means comprises:

a plurality of distributors longitudinally-spaced along said

completion assembly; and wherein each of said plurality of distributors comprises:



a plurality of helically-shaped vanes affixed on said completion assembly.

4,995,457

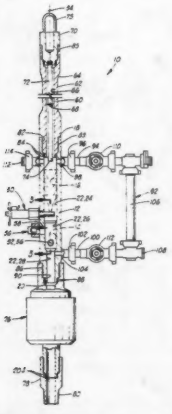
LIFT-THROUGH HEAD AND SWIVEL

Morris G. Baldridge, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Dec. 1, 1989, Ser. No. 444,657

Int. Cl.[5] E21B *33/05, 33/16*

U.S. Cl. 166—70 **16 Claims**



13. A cementing head apparatus, comprising:

a container body having a generally cylindrical body bore defined therethrough, said body bore having an inside diameter;

a first cylindrical release plunger operably associated with said body and being movable between a first position wherein said plunger extends into said body bore and a second position wherein said plunger is withdrawn from said body bore, said cylindrical plunger having a plunger outside diameter;

a spherical releasing ball located above and initially engaging said plunger when said plunger is in its said first position, said ball having a ball diameter greater than one-half of a difference between said inside diameter of said body bore and said plunger outside diameter so that when said plunger is in its said first position, said ball is prevented from moving downward through said body bore past said plunger, and so that when said plunger is withdrawn to its said second position said ball is permitted to drop through said body bore; and

upper and lower cementing lines connected to said container body by hammer unions welded to said container body.

14. A swivel for use with a well, comprising:

a swivel body including:

an upper body portion having a body flow passage defined therethrough, and having a downward facing first counterbore adjacent said flow passage; and

a lower body portion connected to said upper body portion so that a body cavity is defined between said upper and lower body portions, said lower body portion having a lower opening defined therethrough;

a swivel mandrel extending through said lower opening of said lower body portion and having an enlarged diameter mandrel shoulder received in said body cavity, said mandrel having an upper end closely received within said first counterbore of said upper body portion, said swivel mandrel having a mandrel flow passage defined therethrough and communicated with said body flow passage;

bearing means disposed in said body cavity between said swivel body and said swivel mandrel;

first and second seal means, disposed between said upper body portion and said upper end of said swivel mandrel, for sealing between said body cavity and said flow passages and for preventing contamination of an oil lubricating bath in said body cavity by fluids in said flow passages;

an inspection passage means defined in said upper body portion, for detecting failure of either of said first and second seal means; and

wherein said bearing means further comprises:

an upper thrust bearing between said upper end of said swivel mandrel and said upper body portion;

a lower thrust bearing between said mandrel shoulder and said lower body portion; and

an alignment bearing between said swivel mandrel and said lower body portion.

4,995,458

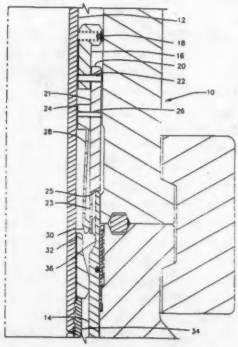
WEAR BUSHING RETRIEVAL TOOL

Keith Garbett, Castleford, England, assignor to Cooper Industries, Inc., Houston, Tex.

Filed Nov. 9, 1989, Ser. No. 434,345

Int. Cl.[5] E21B *17/12*

U.S. Cl. 166—85 **12 Claims**



1. A tool for use in retrieving a wear bushing positioned in surrounding relationship to a casing string from a wellhead assembly comprising:

a generally annular body portion which can be located around a length of casing positioned within a wear bushing within the wellhead assembly,

means for supporting the body portion relative to a length of casing so that it can be lowered into a wellhead with said casing, and

latching means carried by said body portion,

said latching means being so shaped and arranged that it can engage a correspondingly shaped portion on said wear bushing, and

means for actuating the latching means to move it into engagement with the wear bushing.

4,995,459

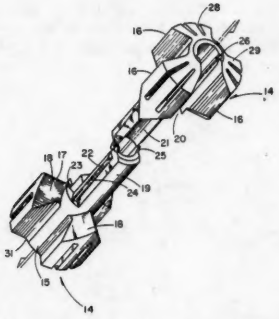
ROD GUIDE/PARAFFIN SCRAPER

John F. Mabry, 307 E. 24 Court, Owasso, Okla. 74055

Filed Jun. 16, 1988, Ser. No. 207,492

Int. Cl.[5] E21B *37/02*

U.S. Cl. 166—176 **6 Claims**



1. A rod guide and paraffin scraper comprising; with a body including longitudinal ribs spaced radially and extending out from said body; having two identical halves with said body surrounding a bore to accept a sucker rod, and each of said identical halves having a locking and tightening feature using a tongue and groove concept for interfitting said halves together over said sucker rod, wherein the improvement comprises:

a rod guide and paraffin scraper with two identical halves comprising;

a cylindrical central body including, at each end, three longitdinal ribs radially spaced to form a triad leaving three flow channels, at each end of said body, of essentially the same size and spacing as the ribs; and an angular wedge with opposingly ramped sides at the inside end of each of said ribs for scraping and directing material into said flow channels;

and a set of triangular shaped tongues that interfit with a set of triangular shaped grooves for tightening saids identical halves together and over the sucker rod;

and a pair of cone-shaped male locks at one end of said identical half to mate with a pair of cone-shaped female locks at the opposite end of said other identical half.

4,995,460

METHOD AND APPARATUS FOR DISPOSING OF WATER AT GAS WELLS

Ronald L. Strahan, 2416 Apple Way, Edmond, Okla. 73013

Filed Dec. 18, 1989, Ser. No. 451,822

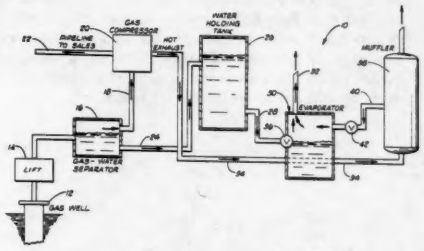
Int. Cl.[5] E21B *43/34*

U.S. Cl. 166—267 **16 Claims**

1. A method for disposing of water produced by a gas well assembly, which gas well assembly includes a gas compressor which produces hot exhaust and a muffler for muffling the noise of the exhaust from the gas compressor, the method comprising:

circulating the water in heat exchange relation with the hot exhaust under conditions permitting the water to vaporize, wherein such circulation is carried out in a vessel through which a conduit carrying the hot exhaust is submerged;

venting steam produced by such circulation; and



feeding a stream of hot exhaust from the muffler through the vessel for promoting the venting of steam from the vessel.

4,995,461

WELL KILL TREATMENT FOR OIL FIELD WELLBORE OPERATIONS

Robert D. Sydansk, Littleton, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Continuation-in-part of Ser. No. 380,057, Jul. 14, 1989. This application Oct. 24, 1989, Ser. No. 426,131

The portion of the term of this patent subsequent to Aug. 14, 2007, has been disclaimed.

Int. Cl.[5] E21B *33/13*

U.S. Cl. 166—295 **21 Claims**

1. A process of killing a well to substantially reduce volumetric flow of a formation fluid across a wellbore face into a wellbore penetrating a formation having a formation matrix and containing said formation fluid below an earthen surface, comprising:

admixing components of a continuous nonflowing gel at said surface to form a partial flowing gel comprising a water-soluble carboxylate-containing polymer, a complex capable of crosslinking said polymer and formed of at least one electropositive chromium III species and at least one electronegative carboxylate species, and an aqueous solvent for said polymer and said complex;

placing said partial gel in said wellbore at said wellbore face, said partial gel which is placed at said wellbore face does not significantly penetrate the formation matrix;

forming said nonflowing gel from said partial gel in said wellbore at said wellbore face to substantially reduce said volumetric flow of said formation fluid across said wellbore face into said wellbore, thereby killing said well; an

removing substantially all of said nonflowing gel from said wellbore face to substantially restore the volumetric flow of said formation fluid into said wellbore.

4,995,462

DEWAXING CONTROL APPARATUS FOR OIL WELL

David Sask; Marcel Obrejanu, and Allen Grimshaw, all of Calgary, Canada, assignors to Maralda Oilwell Technology Ltd., Calgary, Canada

Filed Mar. 30, 1990, Ser. No. 502,402

Claims priority, application Canada, Sep. 29, 1989, 614434

Int. Cl.[5] E21B *37/06, 34/10*

U.S. Cl. 166—304 **8 Claims**

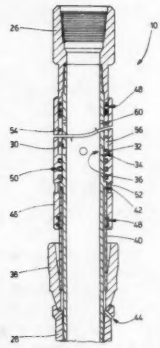
1. Dewaxing control apparatus for use in a well casing containing a tubing string which defines an annulus within the well casing and containing a down hole pump which pumps oil in a lower portion of the well annulus up through the interior of the tubing string, the dewaxing control apparatus comprising:

a housing having a liquid transfer passage and adapted to be installed in-line with the tubing string above the pump with a first end of the liquid transfer passage communicat-

ing with the annulus and a second end of the liquid transfer passage communicating with the interior of the tubing string;

packer means mounted on the housing for closing the annulus against downward flow of liquids at a position below the first end of the liquid transfer passage;

means defining a gas by-pass passage with an upper end positioned to communicate with the annulus above the packer means and a lower end positioned to communicate with the annulus below the packer means;



valve menas for regulating fluid flows along the liquid transfer and gas by-pass passages and operable to assume first and second states, the valve means in the first state closing the liquid transfer passage against transfer of liquids between the annulus and the interior of the tubing string and allowing transfer of gases upwardly along the gas by-pass passage, the valve means in the second state allowing transfer of liquids along the liquid transfer passage between the annulus and the interior of the tubing string and closing the gas by-pass passage against downward flow of liquids.

4,995,463

METHOD FOR FRACTURING COAL SEAMS

Robert C. Kramm, and Robert H. Lane, both of Plano, Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jun. 4, 1990, Ser. No. 532,830

Int. Cl.[5] E21B *43/267*

U.S. Cl. 166—308 **14 Claims**

1. A method for fracturing a coal seam comprising:

injecting a water-based fracturing fluid into said coal seam to initiate and propagate a fracture in the coal seam, said fracturing fluid comprising:

a wetting agent for converting the coal fines which are formed during the fracturing of the coal seam from their natural hydrophobic state to a hydrophilic state; and

a dispersant for dispersing said hydrophilic fines in said fracturing fluid.

4,995,464

WELL APPARATUS AND METHOD

Bruce J. Watkins, and Blake T. DeBerry, both of Houston, Tex., assignors to Dril-Quip, Inc., Houston, Tex.

Filed Aug. 25, 1989, Ser. No. 398,716

Int. Cl.[5] F16L *27/12*; E21B *33/035*

U.S. Cl. 166—382 **26 Claims**

1. A longitudinally adjustable sub for connecting tubular well conduits, comprising

a first tubular member connectable to a first conduit,

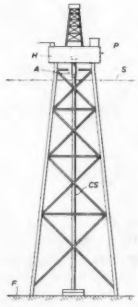
a second tubular member connectable to a second conduit and being spaced concentrically of the first tubular member, and

a sleeve disposed within the space and having first and second threads engaged with threads on the first and second tubular members, respectively, and so related to one another that rotation of the sleeve causes the tubular members to move longitudinally with respect to one another,

the sleeve having means thereon to which a tool removably disposable within the sub may be connected for imparting rotation thereto in order to adjust the sub, and

the threads on the sleeve remaining engaged with longitudinally overlapping threads on the tubular members so as to transmit axial loading between said members essentially in shear.

19. In a method of drilling and/or completing a subsea well, wherein a pipe string anchored at its lower end to a mudline hanger within a well bore at the ocean floor is to be suspended in tension from a seat within a casing head on a platform at the water surface, the steps of



connecting the upper end of the pipe string to a hanger body by means of longitudinally retractable sub to support a shoulder about the hanger body above the seat in the head, said sub comprising

a first tubular member connected to the hanger body,

a second tubular member connected to the upper end of the string and spaced concentrically of the lower end of the first member,

a sleeve disposed within the space and having first and second threads connected to the first and second members, respectively, and so related with respect to one another that rotation of the sleeve causes the tubular members to move longitudinally with respect to one another, and

lowering a tool through the head and hanger body to engage and rotate the sleeve in order to retract the sub and thereby lower the hanger body to land its shoulder on the seat and place the string in tension,

the threads on the sleeve remaining engaged with longitudinally overlapping threads on the tubular members so as to transmit axial loading between said members which is essentially in shear.

4,995,465

ROTARY DRILLSTRING GUIDANCE BY FEEDRATE OSCILLATION

Jeffrey L. Beck, Centerfield, Utah, and Larry D. Taylor, Morgantown, W. Va., assignors to Conoco Inc., Ponca City, Okla.

Filed Nov. 27, 1989, Ser. No. 441,788

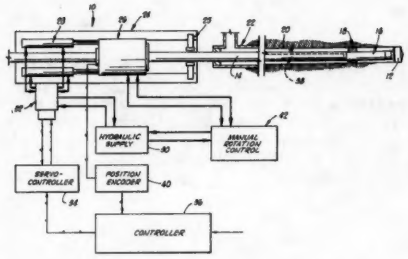
Int. Cl.[5] E21B *3/92, 7/08*

U.S. Cl. 175—27 **12 Claims**

1. A drilling apparatus for drilling a borehole comprising:

(a) a drill rod having a drill bit;

(b) a bent-sub connected with said drill rod behind said drill bit to position said drill bit to extend angularly with respect to said drill rod;
(c) means for exerting thrust along the axis of said drill rod on said drill bit;
(d) means for rotating said drill rod and said drill bit; and
(e) means for controlling said means for exerting thrust, comprising means for selectively exerting thrust on said drill bit along said drill rod at predetermined angular positions of the drill bit as said drill rod rotates.



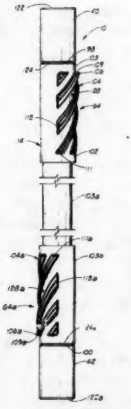
9. A method for controlling directional drilling of a bit on the end of a drillstring, comprising the steps of:
(a) providing a drill rod with a drill bit and bent-sub;
(b) rotating said drill rod; and
(c) selectively exerting thrust forces along the axis of the drill rod at predetermined angular positions of the drill bit as the drill rod rotates for changing the direction of drilling.

4,995,466

METHOD AND DEVICE FOR STABILIZING THE PATH OF A DRILLING TOOL

Roy W. Snow, Jr., 2409 Oakhollow Dr., Newcastle, Okla. 73102

Filed Dec. 22, 1989, Ser. No. 455,976
Int. Cl.[5] E21B *7/10, 7/08*
U.S. Cl. 175—61 **7 Claims**



1. An apparatus for use in a drill string having a drilling fluid passageway inserted into a borehole to stabilize the path of travel of a drilling tool in a borehole attached to the lower end of the drill string, comprising:
a tubular section secured in the drill string having a passageway therethrough communicating with the drilling fluid passageway through the remainder of the drill string, and having an outer wall essentially circular in cross section;
a sleeve telescoped over said tubular section having at least two camming surfaces on the outer periphery thereof substantially on opposite sides of the sleeve and spaced longitudinally along the sleeve; and
means for selectively controlling rotation of the sleeve on the tubular section comprising:
at least one shoe carried by the tubular section; and
means for urging the shoe into frictional engagement with the inner periphery of the sleeve comprising:
at least one recessed portion in the outer periphery of the tubular section sized to receive the shoe;
at least one reservoir in the recessed portion sized to receive a spring; and
said spring disposed in the reservoir capable of urging the shoe into frictional engagement with the inner periphery of the sleeve,
wherein the shoe is disposed in the recessed portion.

7. A method for stabilizing a path of travel of a drilling tool in a borehole, the drilling tool being attached to a lower end of a drill string having a drilling fluid passageway therethrough, comprising:
attaching an apparatus to the drill string wherein the apparatus has a first end and a second end, the first end being attached to a portion of the drill string, wherein the apparatus comprises:
a tubular section secured in a portion of the drill string having a passageway therethrough communicating with the drilling fluid passageway, and having an outer wall essentially circular in cross section;
a sleeve telescoped over said tubular section having at least two camming surfaces on the outer periphery thereof substantially on opposite sides of the sleeve and spaced longitudinally along the sleeve; and
means for selectively controlling rotation of the sleeve on the tubular section comprising:
at least one shoe carried by the tubular section; and
means for urging the shoe into frictional engagement with the inner periphery of the sleeve, comprising:
at least one recessed portion in the outer periphery of the tubular section sized to receive the shoe;
at least one reservoir in the recessed portion sized to receive a spring; and
said spring disposed in the reservoir capable of urging the shoe into frictional engagement with the inner periphery of the sleeve; and
attaching the second end of the apparatus to one of another drill string terminating in a drilling tool or a drilling tool;
inserting the drilling tool, apparatus and at least a portion of the drill string into the borehole; and
rotating the drilling tool, apparatus and drill string thereby drilling a path of travel,
wherein the camming surfaces are capable of contacting walls of the borehole when the drilling tool deviates from a substantially straight bath of travel realigning the path of travel in the drilling tool in a substantially straight path of travel.

4,995,467

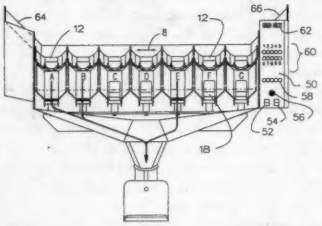
METHOD AND APPARATUS FOR WEIGHING AND DISPENSING OBJECTS

Gary O. Niemann, 3204 E. Lake Hartridge Dr., Winter Haven, Fla. 33880

Filed Jun. 9, 1989, Ser. No. 363,931
Int. Cl.[5] G01G *13/16*
U.S. Cl. 177—25.18 **15 Claims**

4. Apparatus for supplying a combination of objects having an optimum weight comprising a plurality of lanes, each of said lanes being for receiving a group of said objects, means for supplying each of said lanes with a predetermined number of

said objects, means for weighing each of said groups of objects in each of said lanes, means for determining the combination of



said groups having an optimum weight, and means for releasing said combination of groups for collection.

4,995,468

LOAD WEIGHT MEASURING SYSTEM MOUNTED ON A CONSTRUCTION MACHINE

Masao Fukuda, Kawagoe, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

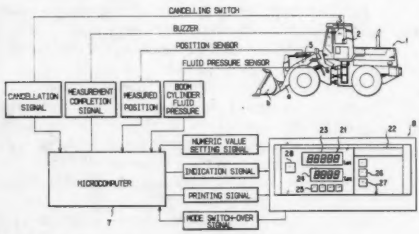
PCT No. PCT/JP87/00942, § 371 Date Jun. 2, 1989, § 102(e) Date Jun. 2, 1989, PCT Pub. No. WO88/04413, PCT Pub. Date Jun. 16, 1988

PCT Filed Dec. 4, 1987, Ser. No. 368,325

Claims priority, application Japan, Dec. 4, 1986, 61-287590

Int. Cl.[5] G01G *19/08, 19/10*

U.S. Cl. 177—139 **2 Claims**



1. A load weight measuring system mounted on a construction machine of the type which includes a boom operative by fluid pressure in a boom actuating cylinder which controls said boom having a load-transferring member connected thereto, comprising:

a boom position sensor for sensing a position of said boom;

a boom actuating cylinder fluid sensor for sensing boom cylinder pressure in said boom actuating cylinder;

a first weight indicating unit for indicating the weight of a load actually laded on a loadable vehicle by said construction machine each time as a cumulative measured load weight;

a second weight indicating unit for indicating a substracted weight as the weight obtained by substracting the current cumulative measured load weight from a preset weight of the load to be laded thereon to define the weight of the load which can be laded further on said loadable vehicle by said construction machine; and

controlling means for controlling the weight indication in the first and second weight indicating units using at least the fluid pressure in the boom actuating cylinder and the boom position as detecting elements, whereby the weight of the load actually loaded by the load-transferring member of said construction vehicle is measured and compared by computation with a preset weight of the load to be laded thereon thereby to indicate the weight of the remaining load which can be further laded thereon so that overloading thereof can be prevented.

4,995,469

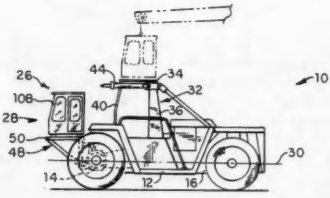
OPERATOR'S STATION MOUNTING ARRANGEMENT AND METHOD

Jan Mikkelsen, Borre, and Kjell Sorlie, Tonsberg, both of Norway, assignors to Caterpillar Industrial Inc., Mentor, Ohio

Filed Sep. 25, 1989, Ser. No. 412,048

Int. Cl.[5] B62D *33/063, 33/077*

U.S. Cl. 180—89.13 **13 Claims**



1. A mounting arrangement for facilitating the positioning of an operator's station on the frame of a work vehicle at a plurality of elevationally spaced apart positions relative to a longitudinal axis of the work vehicle comprising:

a first frame having a supporting portion and being connected to the vehicle frame, said supporting portion being spaced a first preselected elevational distance from the longitudinal axis and defining a first position at which the operator's station is supportable;

a second frame having a supporting portion and being connectable to the vehicle frame, said second frame supporting portion being elevationally spaced from said first frame supporting portion and defining a second elevational position at which the operator's station is supportable;

connecting means for connecting said operator's station to the supporting portion of the first and second frames;

a lift mast assembly;

means for releasably connecting a selected one of the lift mast assembly and the second frame to the vehicle frame, said lift mast assembly and second frame each having first and second spaced apart flanges and an aperture disposed through each of said flanges, said releasable connecting means including;

a first pair of spaced apart ears connected to the vehicle frame, said ears each having an aperture and said apertures being axially aligned;

a second pair of spaced apart ears connected to the vehicle frame; said second pair of ears each having and aperture and said apertures of the second pair or ears being axially aligned, said first flange being disposable between the ears of the first pair or ears and said second flange being disposable between the ears of the second pair of ears;

a first shaft disposable in the apertures of the first pair of ears and the first flange; and

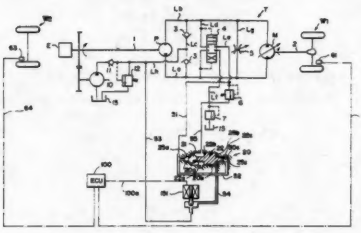
a second shaft disposable in the apertures of the second pair of ears and the second flange.

4,995,470

CONTROL APPARATUS FOR HYDRAULIC CONTINUOUSLY VARIABLE SPEED TRANSMISSION

Kouji Yamaguchi, Saitama, and Kazuya Maki, Aichi, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 19, 1988, Ser. No. 259,877
Claims priority, application Japan, Oct. 22, 1987, 62-267436
Int. Cl.[5] B60K *17/10*
U.S. Cl. 180—197 **9 Claims**



1. A control apparatus for a continuously variable speed transmission for a vehicle having a hydraulic pump connected to an engine, a hydraulic motor connected to driving wheels, and a hydraulic closed circuit hydraulically connecting said hydraulic pump with said hydraulic motor, said hydraulic closed circuit comprising a first hydraulic line through which a delivery port of said pump communicates with a suction port of said motor and a second hydraulic line through which a suction port of said pump communicates with a delivery port of said motor, at least one of said hydraulic pump and said hydraulic motor being a variable displacement type,

the control apparatus comprising:

a slip detecting means for detecting slip of the driving wheels driven by said hydraulic motor, and

hydraulic control means for lowering hydraulic pressure in said hydraulic closed circuit in accordance with a magnitude of the slip detected by said slip detecting means, in such a way that driving force applied to said driving wheels is reduced so as to be less than a slip limit force, the slip of said driving wheels being increased when the driving force applied to said driving wheels exceeds said slip limit force.

4,995,471

AIR CLEANER AND CARBURETOR LAYOUT FOR MOTORCYCLES

Naoki Hara, and Nobuo Yamaguchi, both of Asaka, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 814,548, Dec. 30, 1985, Pat. No. 4,815,554. This application Feb. 3, 1989, Ser. No. 306,739
Claims priority, application Japan, Jan. 17, 1985, 60-4346
The portion of the term of this patent subsequent to Mar. 28, 2006, has been disclaimed.
Int. Cl.[5] B60K *13/02, 13/04;* **B62K** *25/20;* **F02B** *61/02*
U.S. Cl. 180—219 **3 Claims**

1. In a motorcycle having a rear wheel, a pivotally mounted power unit rotatably mounting the rear wheel about a rotational axis and comprising:

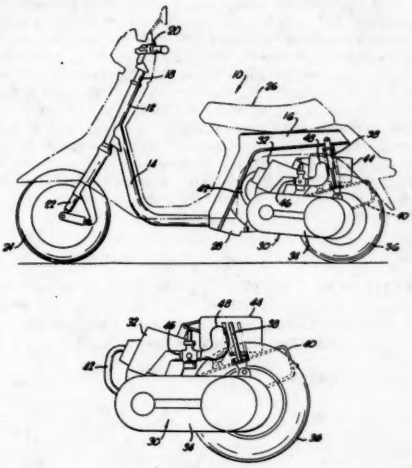
an engine;

a power train disposed both forwardly of and to one side of the rear wheel to operatively couple said engine to the rear wheel;

a muffler extending rearwardly from the engine and disposed on the other side of the rear wheel from said power train;

a carburetor coupled with said engine;

an air cleaner having an air flow passage communicating with said carburetor, said air cleaner being superposed above said muffler;



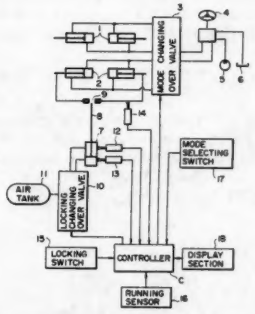
a connecting tube extending between said carburetor and said air cleaner and extending above and forwardly of the rotational axis of the rear wheel.

4,995,472

STEERING CONTROLLING DEVICE FOR WHEEL CRANE

Norihiko Hayashi; Tsuyoshi Katada, both of Kakogawa, and Yukio Koizumi, Akashi, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Nov. 17, 1989, Ser. No. 437,740
Claims priority, application Japan, May 11, 1989, 1-54626[U]
Int. Cl.[5] B60K *17/358*
U.S. Cl. 180—234 **2 Claims**



1. A steering controlling device for a wheel crane, comprising a front wheel steering cylinder for steering front wheels of said wheel crane, a rear wheel steering cylinder for steering rear wheels of said wheel crane, a mode changing over valve for controlling operation of said front and rear wheel steering cylinders and comprising means to change over a steering mode between a normal steering mode in which only said front wheels are steered and a special steering mode in which at least said rear wheels are steered, a mode selecting switch for selecting one of the normal steering mode and the special steering mode, a locking device comprising means for locking said rear

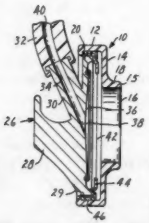
wheels from operation in the normal steering mode, a locking switch comprising means for selecting one of a locking operation and an unlocking operation of said locking device, a running detecting means for detecting which one of a normal running condition and a stopping or a low speed running condition said crane is in, a locking change-over controlling means operable in response to a signal from said locking switch and to a signal from said running detecting means that the crane is only in a stopping or a low speed running condition for forwarding an instruction signal for one of a locking operation and an unlocking operation to said locking device when said crane is not in the normal running condition, and a mode change-over controlling means responsive to a signal from said running detecting means for forwarding a steering mode selected by said mode selecting switch to said mode changing over valve only when said crane is not in the normal running condition.

4,995,473

STETHOSCOPE WITH DIAPHRAGM HEAD ADAPTER

Thomas J. Packard, Somerset, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 21, 1989, Ser. No. 454,178
Int. Cl.[5] A61B 7/02
U.S. Cl. 181—137 **21 Claims**



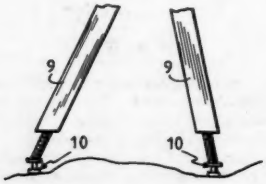
1. A stethoscope head, comprising:
a body surrounded by a releasable engagment perimeter,
a diaphragm residing in said body and having a sound receiving surface area within said perimeter, and
an adapter releasably engaging said perimeter, said adapter comprising a perimeter engaging edge portion, a cover portion extending from said edge portion, and a rim at which said cover portion terminates to define a central opening having an area less than said sound receiving surface area.

4,995,474

SAFETY LADDER

Edward Gauthier, 38 Colorado St., Springfield, Mass. 01118

Filed Jan. 22, 1990, Ser. No. 467,400
Int. Cl.[5] E06C 7/44
U.S. Cl. 182—201 **8 Claims**



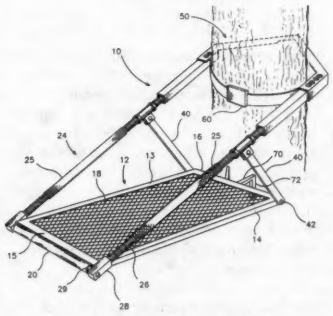
1. An adjustable ladder, comprising:
(a) at least two legs each of which containing a smooth longitudinal blind bore;
(b) a steel hollow pipe having an outer surface and being smoothly disposed in said longitudinal blind bore while providing additional strength to said at least two legs;
(c) a rod disposed concentrically in said steel hollow pipe and vacillating up and down therein without any hindrance so that its ease of operation is increased;
(d) a solid piece of steel drilled and tapped so as to contain a throughbore that will accommodate said steel hollow pipe; and
(e) a flat steel plate affixed to said solid piece of steel and containing a skewly drilled hole so that said skewly drilled hole lines up with said outer surface of said steel hollow pipe.

4,995,475

HUNTER'S PORTABLE TREE STAND

Ronald L. Berkbuegler, 209 E. Marceau, St. Louis, Mo. 63111

Filed Oct. 13, 1989, Ser. No. 421,401
Int. Cl.[5] A45F 3/26; A47C 9/10
U.S. Cl. 182—187 **13 Claims**



1. A hunter's portable tree stand comprising:
an elongated platform having a front end and a rear end;
a pair of laterally spaced support arms each having a front end and a rear end;
means pivotally securing the front ends of said support arms to the front end of the platform;
a pair of laterally spaced upright brace members each having a top end and a bottom end, the bottom ends of said brace members being adjustable and connected to the rear end of the platform, the top ends of said brace members being connected to the rear ends of said support arms by a pivot pin; and
a clamping yoke that passes around the trunk of a tree and it has opposite ends that are detachably connected to the respective rear ends of said support arms;
said support arms each including means for selectively adjusting angle of the platform with respect to the trunk of the tree while said support arms continuously support the front end of the platform and the weight of a hunter thereon.

4,995,476

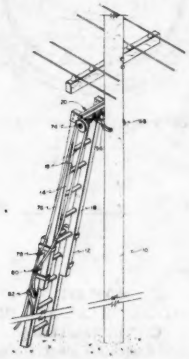
SAFETY ATTACHMENTS FOR LADDERS

Robert J. Buck, Box 263, St. Marys, W. Va. 26170

Filed May 21, 1990, Ser. No. 525,990
Int. Cl.[5] E04C 7/48
U.S. Cl. 182—206 **9 Claims**

1. A safety attachment for a ladder adapted to clamp the ladder to a utility pole or the like comprising a support mount adapted to be secured to rails of the ladder, a channel member carried by said mount and having convergent flanges with spaced apart end portions, bearing blocks fixed in said channel member adjacent opposite ends of said channel member, a screw shaft rotatably mounted in said respective bearing

blocks, said shaft including a right hand threaded portion and a left hand threaded portion and a stop element centrally fixed therebetween a right hand threaded guide block operatively disposed on said right hand threaded portion of said shaft and a left hand threaded guide block operatively disposed on said right hand threaded portion whereby rotation of said shaft causes axial movement of said guide blocks toward and away from each other, a pole engaging arm on each guide block for



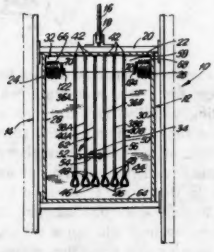
movement therewith, said shaft having a free end extending beyond its adjacent bearing block so as to be outside of the ladder rail, a pulley fixed on said free end; and a rope looped over said pulley and having end portions extending toward the bottom of the ladder whereby an operator at the bottom of the ladder may rotate said pulley and said shaft for movement of said guide blocks causing said arms to release and engage the pole.

4,995,477

SAFETY DEVICE FOR ELEVATORS

Ann Perricone, 6802 Ridge Blvd., Brooklyn, N.Y. 11220

Filed Mar. 1, 1990, Ser. No. 487,155
Int. Cl.[5] B66B 9/00
U.S. Cl. 187—1 R **12 Claims**



1. A safety device for elevators which can support passengers above a floor of an elevator car, said device comprising:

at least one overhead panel extending across an upper portion of the elevator car to provide an overhead compartment within the elevator car;

a plurality of rope-like means for supporting the passengers above the floor of the elevator car when said one overhead panel is in an opened position;

said rope-like means being stored within said overhead compartment prior to use thereof when said one overhead panel is in a closed position;

each of said rope-like means having one end secured to a roof of the elevator car within said overhead compartment, and having an opposite free end provide with foot means for supporting a passenger's foot;

opening means for opening said one overhead panel so that said rope-like means are released from said overhead compartment and said free ends of said rope-like means with said foot means thereon fall into an internal space of the elevator car occupied by the passengers; and

actuating means disposed within the elevator car at a selected position below said one overhead panel within reach of the passengers for actuating said opening means for opening said one overhead panel;

whereby one of the passengers activates said actuating means to actuate said opening means to open said one overhead panel so that said free ends of said rope-like means fall into the internal space of the elevator car to permit the passengers to step into said foot means to raise themselves above the elevator car floor

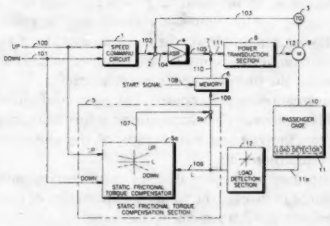
---

4,995,478

START COMPENSATION DEVICE FOR ELEVATORS

Kenji Oshima, Narita, and Yasutami Kito, Tokyo, both of Japan, assignors to Otis Elevator Company, Farmington, Conn.

Filed Apr. 20, 1989, Ser. No. 340,987
Claims priority, application Japan, Apr. 21, 1988, 63-99227
Int. Cl.[5] B66B 1/30
U.S. Cl. 187—115 **1 Claim**



1. A start compensation device for an elevator motor controller performing start compensation by detecting a load of a passenger cage and adding a compensation signal corresponding to the detected load to a torque command signal, the elevator start compensation device comprising:

a load sensor, for providing a load detection signal indicative of the load upon the elevator car;

a speed sensor for providing a speed signal proportional to a rotating speed of the elevator motor;

a speed command circuit, responsive to direction indicating command signals, for providing a speed command signal for commanding lifting and lowering of the elevator car at a selected speed;

an automatic speed control amplifier, responsive to a signal having a magnitude indicative of a difference between said speed command signal and said speed signal, for providing a torque command signal;

a static frictional torque compensator, responsive to said load detection signal and to said direction indicating command signals, for determining a static frictional torque according to the magnitude of the load and the direction of hoisting, for providing a compensation signal corresponding to said static frictional torque;

a first summing means for adding said load detection signal to said compensation signal and providing a load-boosted compensation signal; and

a second summing means for adding said load-boosted signal to said torque command signal and providing a load-boosted compensated torque signal for driving said elevator motor.

4,995,479

DISPLAY GUIDE APPARATUS OF ELEVATOR AND ITS DISPLAY METHOD

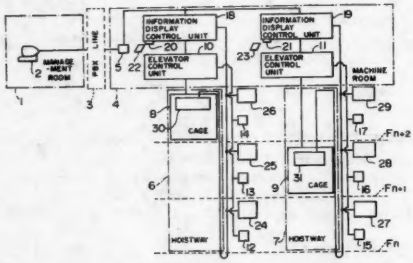
Michio Fujiwara; Hiroshi Matsumaru, both of Katsuta; Yasushi Kobayashi, Yokohama; Yoshio Sakai, Ibaraki; Kenzi Yoneda, Katsuta; Osamu Dohi, Katsuta, and Akihiko Noguchi, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 6, 1989, Ser. No. 319,308

Claims priority, application Japan, Mar. 9, 1988, 63-53539; Apr. 25, 1988, 63-100351

Int. Cl.[5] B66B *3/00*

U.S. Cl. 187—135 24 Claims



1. An elevator display guide apparatus comprising an elevator control unit, an information production unit and an information display control unit, said elevator display guide apparatus displaying running information of an elevator and general information on display units at least disposed in halls according to a running situation of the elevator, wherein:

the information display control unit is so configured that an auxiliary memory medium storing information required to display the running information of the elevator may be mounted thereon;

the information display control unit derives information required to display the running information of the elevator from said auxiliary memory medium;

the information display control unit derives information required to display general information from the information production unit; and

the running information of the elevator and general information are displayed on display units at least disposed in halls according to information relating to the running situation of the elevator derived from the elevator control unit.

4,995,480

VEHICLE BRAKE

Roger J. Hazelden, Redditch; Ian J. Sheppard, Kenilworth, and Philip A. Taft, Cheswick Green, all of Great Britain, assignors to Lucas Industries public limited company, Birmingham, England

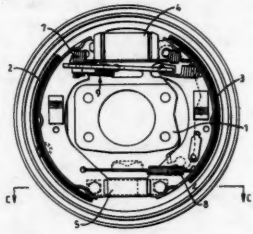
Filed Mar. 9, 1990, Ser. No. 491,098

Claims priority, application United Kingdom, Mar. 17, 1989, 8906137

Int. Cl.[5] F16D *66/00*

U.S. Cl. 188—1.11 11 Claims

1. A vehicle brake comprising a relatively fixed torque-bearing member carrying at least one friction element and an actuator operable to urge said element into braking engagement with a rotatable braking surface, deflectable means arranged in the force transmission path between said element and the torque-bearing member so as to be subject to torque arising on said element during braking and deflectable by load arising from said torque, radiation input means arranged to direct radiation at a surface on said deflectable means and means arranged to sense radiation which has impinged on said surface and to transmit the sensed radiation to means producing a



responsive electrical output representing deflections of said portion.

4,995,481

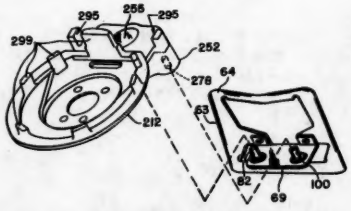
INTEGRATED DISC BRAKE AND DRUM BRAKE CONSTRUCTION

Robert B. Temple, and James J. Colpaert, both of Granger, Ind., assignors to Allied-Signal Inc., Morristown, N.J.

Division of Ser. No. 240,661, Sep. 6, 1988, abandoned, which is a division of Ser. No. 73,923, Jul. 15, 1987, Pat. No. 4,784,241, which is a continuation-in-part of Ser. No. 911,836, Sep. 26, 1986, abandoned. This application Oct. 23, 1989, Ser. No. 425,459

Int. Cl.[5] F16D *63/00*

U.S. Cl. 188—70 R 4 Claims



1. A support member connected with a vehicular axle and providing support for a disc and drum brake, said support member extending radially outwardly to a piston housing integral with said support member, characterized in that the piston housing has at least one through opening receiving therein piston means and the housing having blind bores extending therein, the disc brake comprising an axially movable yoke member having load bearing pin means connected thereto and extending into said bores for slidable movement relative to said housing and providing means for transmitting service braking torque from a yoke carried first brake pad to said housing and support member, the support member extending into a central opening of the yoke member to provide radial and circumferential support portions for a second brake pad, and the support member extending axially to provide an anchor plate for drum brake shoes of said drum brake, the support member, housing, and anchor plate comprising an integral member of a combined disc and drum brake construction such that service braking torque is transmitted to the housing and support member and parking brake torque from the drum brake shoes is received by the support member through the anchor plate.

4,995,482
DISC BRAKE

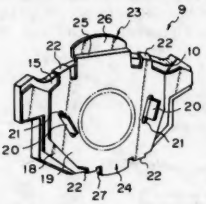
Kinzo Kobayashi, Kanagawa; Shinichi Nakayama, and Shigeo Suzuki, both of Yamanashi, all of Japan, assignors to Tokico Ltd., Kawasaki, Japan

Continuation-in-part of Ser. No. 360,868, Jun. 2, 1989. This application Jan. 23, 1990, Ser. No. 468,909

Claims priority, application Japan, Jun. 14, 1988, 63-78529; Oct. 19, 1989, 65-122565

Int. Cl.[5] F16D *65/847*

U.S. Cl. 188—73.1 **4 Claims**



1. A disc brake comprising:
a carrier member;
a disc;
a pair of friction pads respectively disposed on each side of said disc,
said friction pads slidably supported by said carrier member to allow sliding in the axial direction of the disc, one of said friction pads having a backing member;
a caliper straddling the disc and slidably mounted to said carrier to allow sliding in the axial direction of the disc,
said caliper having at least a cylinder portion;
a piston slidably mounted in said cylinder portion of said caliper to allow sliding in the axial direction of the disc,
said piston facing said one of said friction pads at the side thereof remote from said disc;
a boot means for shielding a sliding contact area defined between said piston and said cylinder portion;
a shim means disposed between said piston and said backing member of said one of said friction pads; and
a shielding plate formed integrally with said shim means and located between said disc and said boot means,
said shielding plate having a first portion axially extending from said shim toward said disc and a second portion radially outwardly extending from the extension of said first portion.

4,995,483
MOTOR POSITION FEEDBACK CONTROLLED ELECTRICALLY ACTUATED AIRCRAFT BRAKE

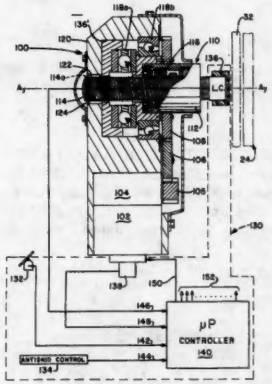
Douglas D. Moseley, Uniontown, and Edgar J. Ruof, Akron, both of Ohio, assignors to Aircraft Braking Systems Corporation, Akron, Ohio

Filed Dec. 18, 1989, Ser. No. 451,691

Int. Cl.[5] B60T *13/24*

U.S. Cl. 188—162 **12 Claims**

1. An electrically controlled brake actuator for an aircraft multi-disk brake assembly comprising in combination:
a reciprocating drive mechanism operatively mounted to effect brake clearing and release of the multi-disk brake through a pressure plate of the assembly, the drive mechanism converting a rotational motion of one of its members to an axial translation of another member which is positioned for contacting engagement with the brake pressure plate;
gear drive means operatively mounted in association with the reciprocating drive mechanism to effect rotation of the one member;
an electrically responsive torque motor operatively mounted to work the gear drive means;
means operatively mounted in association with the torque motor to provide an electrical signal indicative of the motor rotor position at any instant in time;
means operatively mounted in association with the reciprocating drive mechanism to provide an electrical signal indicative of the initiation of a brake clamping force on the multi-disk brake;
means providing an electrical signal indicative of a pilot's command for wheel braking;
means providing an electrical signal indicative of brake release for antiskid braking; and
a microprocessor controller including a counter calibrated to the number of torque motor rotor revolutions required



to move the axially translating member of the reciprocating drive mechanism an axial distance equal to one-hundred percent brake clamping, said controller adapted to receive the signals indicative of (i) the motor rotor position, (ii) the initiation of brake clamping, (iii) a pilot's command for braking, and (iv) brake release for antiskid braking, to provide an output feedback signal to the torque motor which effects an adjustment of the motor position, in revolutions, to increase or decrease brake clamping in accordance with the pilot's command for braking and to effect brake release in accordance with an overriding command for antiskid braking.

4,995,484
BRAKE DISCS OR BRAKE DRUMS

Karl Kadel, Weinstadt, Fed. Rep. of Germany, assignor to Daimler-Benz AG, Fed. Rep. of Germany

Filed Jul. 28, 1989, Ser. No. 386,235

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1988, 3826063

Int. Cl.[5] C23F *15/00*; F16D *65/12*

U.S. Cl. 188—218 R **11 Claims**

1. Spare part element, comprising at least one of a brake disc and a brake drum which are provided with rotationally symmetrical braking surface areas, wherein, in a braking surface region of the braking surface areas, there is adhered to the

braking areas at least one peelable piece cut to size from a sheet of material and completely covering the braking surface area,

said peelable piece having an anti-corrosive coating applied thereto so as to cover completely said spare part element.

4,995,485

SEALING STRUCTURE OF AN ACCUMULATOR

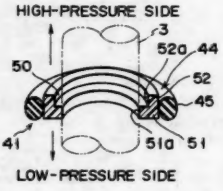
Kouji Nakamura, and Mamoru Akeda, both of Yokohama, Japan, assignors to NHK Spring Co., Ltd., Yokohama, Japan

Filed Jul. 27, 1989, Ser. No. 386,567

Claims priority, application Japan, Aug. 5, 1988, 63-103983[U]

Int. Cl.[5] F16F *9/36*

U.S. Cl. 188—322.17 **10 Claims**



1. A sealing structure of an accumulator which comprises a housing, having a closed end and an open end and containing a hydraulic fluid therein, and a rod adapted to be inserted into the housing through the open and thereof, the rod having an outer peripheral surface, said sealing structure being located at that portion of the accumulator where the rod is inserted into the housing,

said sealing structure comprising:

a high-pressure sealing device situated at a position near to the open end of the housing;

a low-pressure sealing device disposed between the high-pressure sealing device and the open end of the housing;

said high-pressure sealing device including:

(A) a seal ring disposed in the vicinity of the open end of the housing and having a substantially L-shaped section at each circumferential part thereof, the seal ring including a thin wall portion situated on the high-pressure side and a thick wall portion situated on the low-pressure side, the thin and thick wall portions having respective inner peripheral surfaces, the inner peripheral surface of the thick wall portion being in contact with the outer peripheral surface of the rod so that a gap for the hydraulic fluid is defined between the inner peripheral surface of the thin wall portion and the outer peripheral surface of the rod;

(B) seal retaining means attached to the housing and including an annular groove containing the seal ring, the annular groove having a bottom; and

(C) an O-ring interposed between an outer peripheral surface of the seal ring and the bottom of the annular groove so as to be in intimate contact with the outer peripheral surface of the seal ring and the bottom of the annular groove, throughout the circumference thereof;

drain means connected between the high- and low-pressure sealing devices; and

a hydraulic power unit means, coupled to the drain means, for replenishing the liquid chamber of the housing with hydraulic fluid recovered by means of the drain means.

4,995,486

IMPACT ABSORBER FOR A MOTOR VEHICLE

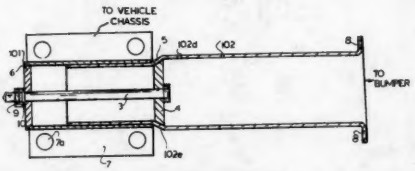
Peter Garneweidner, Salzburg, Austria, assignor to Austria Metall Aktiengesellschaft, Salzburg, Austria

Filed Sep. 28, 1989, Ser. No. 414,143

Claims priority, application Austria, Sep. 28, 1988, 2394/88

Int. Cl.[5] F16F *7/12*

U.S. Cl. 188—374 **1 Claim**



1. An impact absorber for a motor vehicle comprising:

an outer tube and at least one inner tube, said inner tube having a small diameter portion received in said outer tube and a large diameter portion disposed outside said inner tube at one end thereof, said large diameter portion having an outer diameter greater than an inner diameter of said outer tube at said end, whereby upon the application of a collision force axially to said tubes, said tubes are telescopingly contracted by permanent deformation of at least one of said tubes as said large diameter portion is driven into said outer tube, said inner tube being formed with a transition region of conical configuration between said large diameter portion and said small diameter portion of said inner tube;

means confining a space between said tubes which is reduced inn volume upon telescoping contraction of said tubes;

an elastic material received in said space;

means providing a circumferential reinforcement bracing one of said tubes at said transition region, thereby confining deformation to the other of said tubes;

said reinforcement being a member received in said inner tube and braced against an inner surface of said transition region; and

bolt means bracing said member against said outer tube, said outer tube being provided with a further member braced against an end thereof opposite said first mentioned end and said bolt bridges said members and draws said members together.

4,995,487

WHEELED SUITCASE AND LUGGAGE SUPPORT

Robert V. Plath, 3030 NE. 44th St, Lighthouse Point, Fla. 33064

Filed Aug. 8, 1989, Ser. No. 390,960

Int. Cl.[5] A45C *5/14, 13/30, 13/38*

U.S. Cl. 190—18 A **14 Claims**

1. A wheeled suitcase and luggage support comprising:

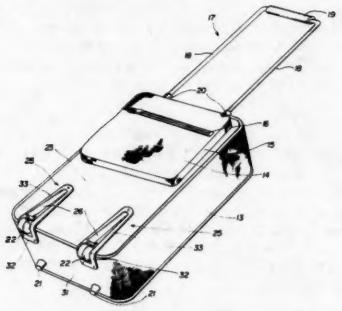
a body portion

a plurality of roller type wheels partially recessed within said body portion,

a generally U-shaped handle having a means for gripping said handle and having two essentially parallel spaced elongated rod members, said rod members each having an axial center line and being slidably retractable between an

extended and a retracted position within said body portion,

a locking means for said U-shaped handle comprising means inside said body portion for receiving said rod members of said handle, and a pair of guides, one each attached to the lowermost end of each of said rod members, said guides



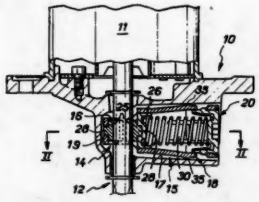
being offset with respect to the axial centerline of said rod members of said U-shaped handle, said guides causing said rod members to frictionally engage said means for receiving whereby said handle remains in any position with respect to said body portion that the user places it in between said extended and retracted position of said handle.

4,995,488

CONTROL DEVICE FOR A COUPLING MEANS SUCH AS A CLUTCH

Patrice Bertin, Mery-Sur-Oise, and Yvon Sévénnec, Vernouillet, both of France, assignors to Valeo, Paris, France

Filed Jan. 16, 1990, Ser. No. 464,928
Claims priority, application France, Jan. 18, 1989, 89 00534
Int. Cl.[5] F16D *23/12, 49/16*
U.S. Cl. 192—1.1 **10 Claims**



1. A servo control device for a torque coupling means, said control device comprising:

a casing defining a mounting defining an internal surface thereof;

a housing being mounted in said mounting so as to float radially therein, the housing defining an opening therethrough and having a housing wall;

a motor fixed with respect to said casing and having an output shaft extending through said opening;

a continuous acting retarding means;

means mounting the retarding means in the housing; and

means coupling the retarding means with the motor output shaft,

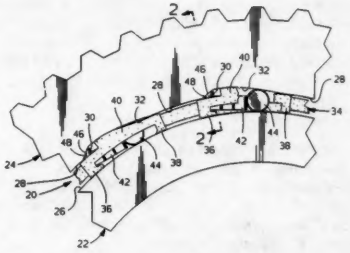
the housing comprising a jacket member which defines said opening of the housing, together with a plug member and means for mounting the plug member on said jacket member, and resilient means being operatively formed as a part on one of said housing or said mounting for biasing said housing against said mounting.

4,995,489

ROLLER CLUTCH WITH SIMPLIFIED INSTALLATION

Frederick E. Lederman, Sandusky, and Albert D. Johnston, Huron, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 20, 1990, Ser. No. 570,652
Int. Cl.[5] F16D *41/07, 15/00*
U.S. Cl. 192—45 **2 Claims**



1. A roller clutch cage adapted for installation to a cam race having a plurality of evenly spaced cam hooks, each of which slopes in one circumferential direction, said cage comprising,

a plurality of evenly spaced planar reaction faces, each sloping in the same direction as, and shaped to conform closely to, a respective cam hook, and,

at least one lead in ramp axially adjacent to a respective reaction face and sloped axially toward, and in the same circumferential direction as, said reaction face, and terminating at the plane of said reaction face,

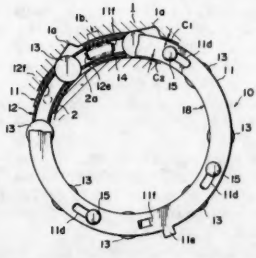
whereby, said cage may be installed by moving it coaxially toward said cam race and indexing it progressively until said lead in ramp engages a cam hook, after which continued axial movement only of said cage acts to slide said cam lead in ramp along said cam hook, thereby twisting said cage in said one circumferential direction until said reaction faces register with said cam hooks.

4,995,490

ROLLER-SYNCHRONIZED ONE-WAY CLUTCH ASSEMBLY

Kenichi Kanai, Chigasaki, Japan, assignor to NSK-Warner Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 173,398, Mar. 25, 1988, abandoned.
This application Sep. 8, 1989, Ser. No. 405,093
Claims priority, application Japan, Mar. 25, 1987, 62-69167
Int. Cl.[5] F16D *41/07*
U.S. Cl. 192—45 **13 Claims**



1. A roller-synchronized one-way clutch assembly, comprising:

a ring-shaped first retainer element;

a ring-shaped second retainer element operatively coupled to said first retainer element to thereby define a retainer sub-assembly such that said second retainer element may move relative to said first retainer element in a circumferential direction over a predetermined range;

a plurality of rollers supported by said retainer sub-assembly and arranged spaced apart from one another in a circumferential direction; and

urging means having a first end connected to said first retainer element and a second end connected to said second retainer element for normally urging said first and second retainer elements to move in opposite directions in the circumferential direction, said urging means being located substantially in a circumference defined by said plurality of rollers and wherein said urging means comprises a pair of discrete springs, each spring being disposed between a pair of adjacent ones of said plurality of rollers.

4,995,401

POWER TRANSMISSION APPARATUS

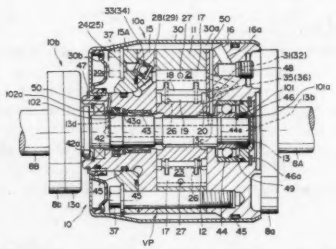
Takeo Hiramatsu, Nagaokakyo; Kenjiro Fujita, Kusatsu; Yoshimasa Nagayoshi, Kyoto; Yoshiaki Hamasaki, and Satoshi Kawai, both of Minamiku, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha and Koyo Seiko Kabushiki Kaisha, both of, Japan

Filed Dec. 6, 1988, Ser. No. 280,409

Claims priority, application Japan, Dec. 8, 1987, 62-310472; Jun. 7, 1988, 63-140117

Int. Cl.[5] F16D *31/00*

U.S. Cl. 192—58 R **10 Claims**



1. A power transmission apparatus suitable for use in a four-wheel drive vehicle having a pair of front wheels and a pair of rear wheels, comprising a first rotary shaft to be connected to one pair of wheels, a second rotary shaft to be connected to the other pair of wheels and a hydraulic transmission coupling mechanism of the vane pump type including a cam ring connected to the first rotary shaft, a rotor connected to the second rotary shaft and accommodated for rotation in said cam ring to define a pump chamber therebetween, a pair of side plates closing the axial opposite ends of said cam ring and each having a through-hole formed therein through which said second rotary shaft extends, said pump chamber containing working fluid therein, said power transmission apparatus being designed to transmit driving force between said first and second rotary shafts in accordance with a pressure of the working fluid in said pump chamber which is produced in response to rotation of said first and second rotary shafts relative to each other, and a frictional force applying mechanism interposed between said first and second rotary shafts for applying predetermined frictional force between said first and second rotary shafts;

wherein said frictional force applying mechanism comprises an annular friction face, an annular friction member, and an annular spring member for biasing said friction member toward said friction face;

wherein said annular friction member is mounted on said second rotary shaft for contacting with said annular friction face formed either on one of said side plates or on a member integral with one of said side plates along a circumferential direction of said second rotary shaft;

wherein said friction member is mounted for axial sliding movement on and integral rotation with said second rotary shaft and said annular spring member is securely mounted on said second rotary shaft; and

wherein said friction face is formed on an annular friction plate mounted on an end face adjacent said first rotary shaft of the one side plate adjacent which said first rotary shaft is connected to said hydraulic transmission coupling mechanism, and said annular spring member is securely mounted at an end of said second rotary shaft adjacent said first rotary shaft by means of a bolt.

4,995,492

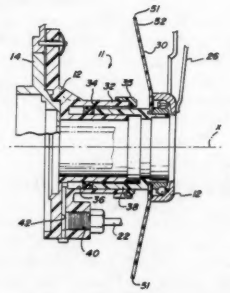
REUSABLE POSITION RETAINING STRAP FOR CLUTCH RELEASE MECHANISM

Bryce W. Babcock, Saline; Daniel F. Kiblawi, Rochester Hills, and Eugene A. Wolbers, Northville, all of Mich., assignors to Federal-Mogul Corporation, Southfield, Mich.

Filed Oct. 10, 1989, Ser. No. 418,615

Int. Cl.[5] F16D *25/08, 23/14;* **F15B** *15/26;* **B65D** *63/00*

U.S. Cl. 192—85 CA **19 Claims**



1. A reusable retaining strap for shipment and installation of a hydraulic actuator and clutch release bearing assembly having a housing defining a cavity and a movable piston received in the cavity, said strap being unbreakable by movement of said piston and comprising:

at least one arm member including means at its forward end for connecting said arm member to said movable piston;

reusable anchoring lugs provided on said arm member at its distal end for connecting said arm member to said housing both before and after operation of said clutch release bearing assembly; and

said arm member having preferential flexing regions at said distal end for providing bending relief, said flexing regions being unbreakable by movement of said piston so as to allow said anchoring lugs to shift position relative to each other upon extension of the piston from said cavity to release said arm member from said housing without breaking said strap.

4,995,493

ROBOT TOOL CHANGER AND OVERLOAD DEVICE

David N. Cotsman, Southfield; John Kovach, Utica; Dante C. Zuccaro, Allenton, and Frank J. Kudwa, Swartz Creek, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 2, 1990, Ser. No. 487,520

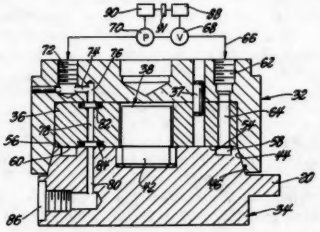
Int. Cl.[5] B25J *17/00, 19/00*

U.S. Cl. 192—150 **10 Claims**

1. A robot tool changer and overload device having a robot connectible first plate and an end of arm tooling device connectible second plate and a magnet means for producing a

magnetic force for holding the first and second plates together characterized by:

means forming coacting inclined surface means on said first and second plates defining a pivot point for separation of said first and second plates when a moment is applied therebetween of a magnitude to overcome the magnet force therebetween; said coacting inclined surface means having a depth and an included inclination angle formed acutely with respect to the longitudinal axis through said first and second plates to produce pivoting of one of said first and second plates through an acute angle corresponding substantially to that of said included angle to release said first and second plates when an overload occurs so as to release all force on the robot by complete separation of said first and second plates; and



release means for imposing a release force between said first and second plates to produce separation between said first and second plates independently of the imposition of any overload moment thereon to allow movement of said first plate with respect to said second plate in a Z axis direction without imposing any load on the robot during such movement.

4,995,494

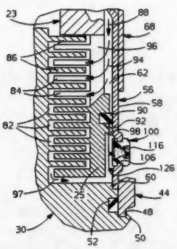
PRESSURE-RESPONSIVE FLUID CHECK VALVE AND METHOD FOR VISCOUS FLUID CLUTCH

Lawrence C. Kennedy, Kettering, and Ronald G. Huth, Huber Heights, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 355,535, May 22, 1989, Pat. No. 4,924,987. This application Dec. 29, 1989, Ser. No. 459,406

Int. Cl.[5] F16D *35/00*

U.S. Cl. 192—58 B **14 Claims**



1. A pump plate assembly for separating a pumping chamber and a reservoir of a viscous fluid clutch, wherein the pumping chamber receives fluid from a shear zone, the pump plate assembly comprising:

(a) a plate member having a front surface in communication with the reservoir and a rear surface in communication with the pumping chamber; and

(b) pressure-responsive fluid control means mounted on the pump plate, the fluid control means including

(i) a resilient body,

(ii) a chamber provided in the body having an inlet in communication with the pumping chamber, and

(iii) a pair of convergent side walls in the chamber terminating in a normally-closed outlet in communication with the reservoir;

whereby when a predetermined fluid pressure is reached in the pumping chamber, the side walls are forced apart to open the outlet, and when the fluid pressure falls below the predetermined level, the side walls return to their original position to close the outlet.

4,995,495

CRUDE OIL EMULSION TREATING APPARATUS

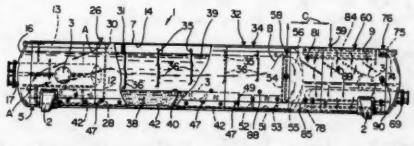
Stephen V. Krynski, Calgary, Canada, assignor to HTI Technology Canada Ltd., Calgary, Canada

Filed Mar. 16, 1990, Ser. No. 494,442

Claims priority, application Canada, Apr. 7, 1989, 596112

Int. Cl.[5] C10G *33/00;* **B01D** *19/00*

U.S. Cl. 196—46 **5 Claims**



1. An apparatus for treating crude oil comprising casing means; first partition means separating the interior of said casing means into a treating section and a flashing section; inlet pipe means in said casing means for introducing crude oil into the treating section of said casing means; first heater means in said treating section for reducing the viscosity of the crude oil; first baffle means in said treating section for facilitating the separation of water and gas from the oil; gas outlet means in said casing means for discharging gas from said treating section; desand means in said casing means for discharging sand from said treating section; water outlet means in said casing means for discharging water from said treating section; first trough means proximate said first partition means in said treating section for receiving at least partially desanded and dewatered crude oil; oil outlet means for feeding oil from said trough means to said flashing section; oil inlet means in said flashing section of said casing means; second baffle means in said flashing section for distributing oil in said flashing section; second trough means in said flashing section of said casing means for receiving oil introduced through said oil inlet means from said first trough means and discharging the oil to said second baffle means; second heater means in said flashing section for vaporizing water remaining in said oil; vapor outlet means in said casing means for discharging water vapor from said flashing section; and treated oil outlet means in said casing means for discharging treated oil from said flashing section.

4,995,496

APPARATUS FOR PROTECTING AN EXTERNAL MECHANISM

Constantine Xigas, Dianella, Australia, assignor to Xigas Holdings Pty. Ltd., Dianella, Australia

Filed Jun. 23, 1989, Ser. No. 371,224

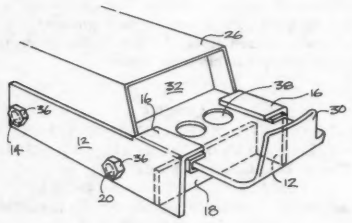
Claims priority, application Australia, Jun. 23, 1988, PI8933

Int. Cl.[5] G07F *9/00*

U.S. Cl. 194—350 **3 Claims**

1. An apparatus for protecting a coin insertion mechanism arranged to be attached to a housing having a front and a pair of sides with the coin insertion mechanism projecting from the front of the housing, said apparatus comprising a pair of spaced, substantially parallel flat plates each having respective, opposed first and second ends, said second ends spaced from said housing with a spacer extending between the plates adja-

cent the opposed second ends thereof so as to secure the plates together and to hold them apart by a predetermined distance, a respective flange on each plate located adjacent the second end thereof and projecting towards the flange on the opposed second end of the other plate a limited distance such that a slot



is disposed between inner ends of the flanges, the spacer being spaced from and located below the flanges so that a coin insertion mechanism can be disposed between the plates below the flanges and above the spacer, the plates being provided with means arranged to fix rigidly the plates to the sides of the housing.

4,995,497

COIN DISCRIMINATION APPARATUS

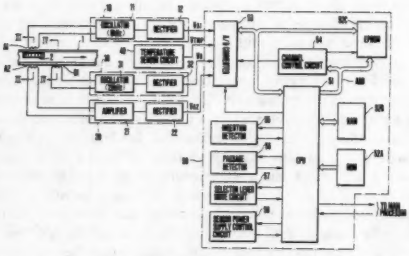
Osamu Kai; Masaaki Tsukada, and Hiroshi Tachibana, all of Tokyo, Japan, assignors to Tamura Electric Works, Ltd., Japan

Filed Jun. 30, 1987, Ser. No. 68,563

Claims priority, application Japan, Jul. 21, 1986, 61-171419

Int. Cl.[5] G07D 5/08

U.S. Cl. 194—318 **7 Claims**



1. A coin discrimination apparatus which determines authenticity and a denomination of a coin by oscillating magnetic fields of high and low frequencies in a low frequency band in which the generated magnetic fluxes pass through a coin, comprising:

first and second oscillators, for generating low and high frequency signals, the frequencies of both said signals being within a low frequency band whereby fields generated from said signals pass through coins;

a first oscillation coil, arranged at a coin contact surface of an inclined coin path, and connected to said first oscillator for generating an oscillating magnetic field at said low frequency, the impedance of said first oscillator coil changing upon the passage of a coin, said change being indicative of a material characteristic of a coin;

a reception coil arranged at a non-contact surface of said inclined coin path and facing said first oscillation coil for sensing changes in said low frequency oscillating magnetic field upon the passage of a coin;

a second oscillation coil, which is arranged on the coin non-contact surface and separated from the reception coil by a predetermined distance in a coin rolling direction, and connected to said second oscillator for generating an oscillating magnetic field at said high frequency, the impedance of said second oscillation coil changing upon the passage of a coin, said change being indicative of said coin's thickness;

maximum change detecting means for detecting respective values in relation to maximum values of said changes in impedances and fields of said oscillation coils and said reception coil upon passage of a coin;

change detecting means for detecting a value in relation to changes in impedances of said first and second oscillation coils when the changes in the impedances thereof coincide with each other as an indication of coin diameter; and

discriminating means for determining authenticity and the denomination of the coin based on coin physical characteristics in accordance with the detection results from said maximum change detecting means and said change detecting means.

4,995,498

RENTAL AND VENDING MACHINE, PARTICULARLY FOR VIDEO CASSETTES, AND CASSETTE CASE FOR VIDEO CASSETTES

Wilhlem Menke, Wiesbaden, Fed. Rep. of Germany, assignor to NSM Apparatebau GmbH & Co. KG, Bingen, Fed. Rep. of Germany

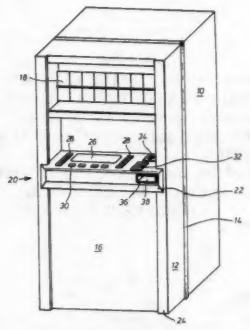
PCT No. PCT/DE87/00496, § 371 Date May 8, 1989, § 102(e) Date May 8, 1989, PCT Pub. No. WO88/03688, PCT Pub. Date May 19, 1988

PCT Filed Nov. 5, 1987, Ser. No. 353,670

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1986, 3637894; Jan. 28, 1987, 3702407

Int. Cl.[5] G07F 7/08

U.S. Cl. 194—205 **22 Claims**



1. Rental and vending machine, particularly for video cassettes, the machine comprising: a cabinet-like housing, two oppositely disposed compartmented arrangements accommodated in the housing for storage of cassette cases containing the video cassettes; a computer controlled cassette transporting device including a horizontal guide and a vertical guide with associated drive motors along which the device can be moved between the two compartmented arrangements to receive cassette cases and to transport them from and to a certain storage compartment and an inserting/dispensing chute, respectively, in the housing; a reading device for reading identification codes which characterize the cassettes; an operating field for selection of the desired cassette and for requesting and loading a cassette, said operating field being attached to the exterior of the housing and including input keys and a display; a cassette transporting carriage which is movable within the housing together with the horizontal or vertical guide and is adjustable in the vertical and horizontal directions with the drive motors being actuable simultaneously in the horizontal and in the vertical directions; and two push-pull mechanisms

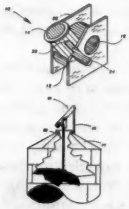
comprising gripper arms provided opposite one another at the cassette transporting carriage for transporting a cassette case from a storage compartment or from the inserting/dispensing chute, respectively, into the cassette receiving area of the cassette transporting carriage and vice versa, said gripper arms being movable from a rest position in the cassette transporting carriage in the direction of the respective storage compartment or inserting/dispensing chute, respectively, wherein the two opposing push-pull mechanisms are attached to the cassette transporting carriage so as to face one another and each gripper arm is configured as an articulated lever having a cam-like profile with a recess and a protuberance, sam cam-like profile being contacted by a switch shaft to control said lever so that, if a cassette case is taken from a storage compartment or from the inserting/dispensing chute, a pivoting movement cases one of its recesses to engage in a corresponding opening in the cassette case and, if a cassette case is transported into a storage compartment or to the inserting/dispensing chute, a protuberance on said lever lies against the frontal face of the cassette case.

4,995,499

METHOD AND APPARATUS FOR REDUCING THE VELOCITY OF PARTICULATE MATTER

Lloyd G. Berquist, Rte. One, Box Fifty-Four, Loomis, Nebr. 68958

Filed Dec. 15, 1989, Ser. No. 451,130
Int. Cl.[5] B65G *11/20*
U.S. Cl. 193—32 **14 Claims**



1. An apparatus for reducing the velocity of a stream of a flowable substance falling in a downwardly inclining conduit, comprising,

a flowable substance braking chamber, having

an inlet port adapted for accepting a flowable substance from a conduit, and

an outlet port adapted for discharging a flowable substance,

a curvilinear support surface having opposing ends connected to said ports,

said curvilinear support surface including an ascending arcuate portion between said inlet port and said outlet port, and

said curvilinear support surface decreasing incrementally between said inlet and outlet port so as to form a spiral providing both the upper and lower surfaces of said braking chamber whereby the velocity of a stream of said flowable substance is reduced before discharge to prevent damage to said flowable substance.

4,995,500

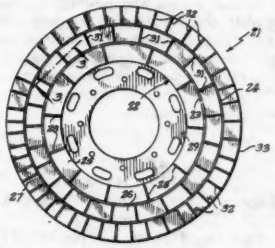
GROOVE PATTERN FOR HIGH THERMAL CAPACITY WET CLUTCH

Parviz Payvar, Wilmette, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Sep. 16, 1986, Ser. No. 907,937
Int. Cl.[5] F16D *13/64, 13/74*
U.S. Cl. 192—107 R **8 Claims**

1. A friction facing for a wet clutch plate comprising an annular facing having inner and outer diameters and a facing surface grooved to receive cooling oil, the improvement comprising that the grooving has a pattern including an annular groove intermediate the inner and outer diameters dividing said surface into two annular bands, and a plurality of radial grooves in each band connecting said annular groove with the inner or outer diameter of said facing, said radial grooves in the inner band being out of radial alignment with the radial grooves of the outer band, the depth of the radial grooves in the outer band is less than that for the radial grooves of the inner band.

8. A friction facing for a wet clutch plate comprising an annular facing having inner and outer diameters and a facing



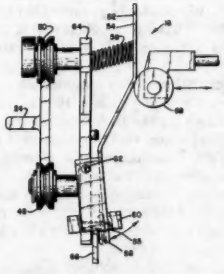
surface grooved to receive cooling oil, the improvement comprising that the grooving has a pattern including an annular groove centrally disposed between said inner and outer diameters dividing said surface into two annular bands, and a plurality of radial grooves in each band connecting said annular groove and the inner or outer diameter of said facing, said radial grooves in the inner band being out of radial alignment with the radial grooves of the outer band, the number of radial grooves in the outer band exceeding the number of radial grooves in the inner band, and the radial grooves in each band are substantially circumferentially equally spaced.

4,995,501

TRANSPORT SYSTEM AND METHOD FOR EMBOSSING APPARATUS

Robert W. Lundstrom, Plymouth; Benjamin H. Sannel, St. Louis Park, and Dennis J. Warwick, Richfield, all of Minn., assignors to DataCard Corporation, Minneapolis, Minn.

Filed Nov. 23, 1988, Ser. No. 276,233
Int. Cl.[5] B65G *49/00*
U.S. Cl. 198—341 **25 Claims**



1. A card handling and transport system for transporting cards from an input to an output along a card transport path extending from the input to the output, comprising:

a plurality of spaced apart locations defined along the card transport path having card processing stations associated with the spaced apart locations placed along the card transport path, wherein the card processing station performs processing operations on plastic cards at the spaced apart locations, the card processing stations being remov-

able for varying the card processing without changing the card transport path;

card transporting means for carrying the card along the card transport path through the card processing stations, the card transporting means comprising card retaining means for retaining the card continuously while transporting the card along the card transport path, and motive means for advancing the card retaining means along the card transport path, wherein the card retaining means comprises a card carriage having a plurality of card grippers, each card gripper mounted on an associated pivoting arm, each arm being positioned by an associated compression spring biasing the arm toward a closed position for pressing the gripper against a card and pushing the card against a backing plate, thereby securing the card; and

programmable control means for positioning the card transporting means and for stopping the retained cards at selected locations for performing selected processing operations, the selected locations corresponding to the associated card processing stations.

4,995,502

PALLET CHANGER

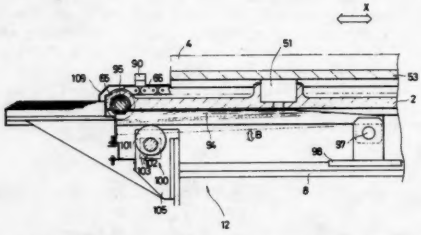
Koichiro Kitamura, Takaoka, Japan, assignor to Kitamura Machinery Co., Ltd., Toyama, Japan

Filed Oct. 11, 1989, Ser. No. 419,953

Claims priority, application Japan, Oct. 17, 1988, 63-259395

Int. Cl.[5] B65G *37/00*

U.S. Cl. 198—346.1 **8 Claims**



1. A pallet changer including a support (1), a table (2) movable on the support (1) along one direction, a plurality of pallets (4, 14) each for holding a workpiece, a drive means (3) for moving the table (2) along the one direction, a transfer means (12) for moving the pallet (4, 14) along the one direction relative to the table (2) when the table (2) is moved by the drive means (3), the transfer means (12) comprising:

a pinion shaft (95) rotatably mounted on the table (2), the pinion shaft (95) having sprockets (65) at the opposite ends thereof and a pinion (96) at an intermediate portion thereof;

a rack member (94) movably mounted on the support (1);

a rack member displacing means (100) mounted on the support (1) for moving the rack member (94) between a first position wherein the rack member (94) can engage the pinion (96) and a second position wherein the rack member (96) can disengage the pinion (96);

counter sprockets rotatably mounted on the table (2) each cooperating with the sprocket (65) of the pinion shaft (95);

chains (66) each placed between the sprocket (65) and the counter sprocket (64); and

engaging means (67) for detachably engaging the chains (66) and the pallet (4, 14), the engaging means (67) including chain hooks (90) fixed to the chains (66) and pallet hooks (63, 91) fixed to the pallet (4, 14),

wherein, when the rack member (94) is in the first position to engage the pinion (95) and the chain hook (90) engages the pallet hook (63), the table (2) is moved along the one direction by the drive means (3) so that the pinion (95) is rotated and moved along the one direction relative to the rack member (94), whereby the sprockets (65) and the chains (66) are rotated so that the pallet (4, 14) is moved along the one direction relative to the table (2) by drive force of the drive means (3).

4,995,503

STARWHEEL CAP SELECTING APPARATUS

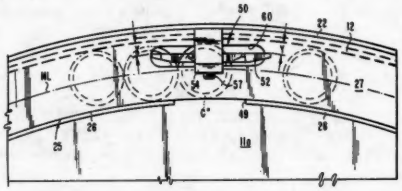
S. Neal Graham, 12997 Fauns Ridge, Fishers, Ind. 46038, and Thomas E. Terry, 328 N. West St., Tipton, Ind. 46072

Continuation of Ser. No. 198,831, May 26, 1988, Pat. No. 4,895,243. This application Nov. 1, 1989, Ser. No. 430,496

The portion of the term of this patent subsequent to Jan. 23, 2007, has been disclaimed.

Int. Cl.[5] B65G *47/24*

U.S. Cl. 198—392 **6 Claims**



1. An apparatus for feeding caps, comprising:

a disk rotatable about its normal axis and having a peripheral portion and a working surface;

means for containing caps disposed on said disk during rotation of said disk, each of said caps having a closed end and an open end;

primary cap selecting means for selecting properly oriented caps from a procession of caps rotating with said disk at said peripheral portion and for ejecting improperly oriented caps onto said working surface;

secondary cap selecting means, rotationally downstream from said primary cap selecting means, for engaging every cap passing said primary selecting means such that properly oriented caps are permitted to pass said secondary selecting means and improperly oriented caps are ejected from said peripheral portion, said secondary cap selecting means including self-clearing means for interrupting said procession of caps at said secondary cap selecting means as said disk is rotating by restraining the downstream rotation of an improperly oriented cap, whereby the interrupted procession of caps exerts pressure on said improperly oriented cap sufficient to urge said improperly oriented cap from said peripheral portion onto said working surface, and further whereby said procession of caps past said secondary cap selecting means resumes when said improperly oriented cap is urged from said peripheral portion; and

a stationary discharge chute intersecting said peripheral portion for feeding properly oriented caps after they have passed said secondary cap selecting means.

4,995,504

DEVICE FOR STRAIGHTENING ARTICLES SUCH AS LETTERS AND SIMILAR FLAT TRANSPORTED ARTICLES

Werner Kühn, Konstanz, Fed. Rep. of Germany, assignor to Licentia Patent-Verwaltungs GmbH, Frankfurt, Fed. Rep. of Germany

Filed Nov. 4, 1987, Ser. No. 117,240

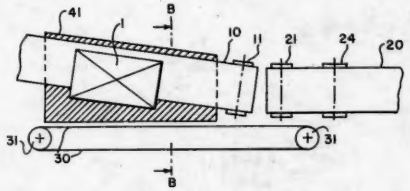
Claims priority, application Fed. Rep. of Germany, Mar. 24, 1987, 3709659

Int. Cl.[5] B65G *47/24*

U.S. Cl. 198—408 **4 Claims**

1. A device for straightening and feeding articles such as a

letter in a mail handling station, comprising a bottom endless conveyor having an upper reach over which the articles are moveable, a free wheeling conveyor section adjacent said bottom endless conveyor comprising a pair of conveyor belts arranged side by side and between which the article is supported and being moveable through a substantially vertical



plane which extends toward said bottom conveyor, a guide plate behind each conveyor belt having a lower portion of a configuration and position such that it extends substantially up to the adjacent conveyor belt, and parallel to the direction of movement of said free wheeling conveyor section, said guide plate having a width substantially equal to the thickness of the associated conveyor belt.

4,995,505

TRANSFER METHOD AND DEVICE AND DRIVING SYSTEM THEREFOR FOR TRANSFER PRESSES

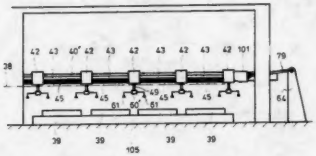
Yoshio Takahashi; Mitsuo Sudo, both of Yokohama; Takamasa Arikawa, Kawasaki; Kenji Nakamura, Kamakura; Izumi Sato, Yokosuka; Katsuyuki Onogi, Yokohama; Takao Iura, Yokosuka, and Nobuji Ishida, Yokohama, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Japan

Filed Oct. 20, 1988, Ser. No. 260,449

Claims priority, application Japan, Oct. 31, 1987, 62-276589; Nov. 13, 1987, 62-287011; Nov. 20, 1987, 62-293203; Nov. 20, 1987, 62-177373; Nov. 20, 1987, 62-177370; Nov. 20, 1987, 62-177372; Dec. 29, 1987, 62-198888; May 9, 1988, 63-112090

Int. Cl.[5] B65G *25/04*

U.S. Cl. 198—468.4 **2 Claims**



1. A driving system for driving a transfer device for transfer presses comprising

a transfer lever swingably movable about a pivot shaft by a transfer cam,

a lift link rotatably attached to an upper end portion of said transfer lever with a horizontal shaft,

a lift lever carried by said pivot shaft and swingable by a lift cam, and

a lift rod connecting said lift lever with said lift link in parallel with a line interconnecting said pivot shaft and said horizontal shaft, said lift rod being equal in length to said interconnecting line.

4,995,506

CONVEYOR INCLUDING AN ENDLESS FLEXIBLE CONVEYING ELEMENT AND A TENSIONING DEVICE FOR THE CONVEYING ELEMENT

Markus Langenbacher, Kornwestheim, and Gernot Maier, Stuttgart, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

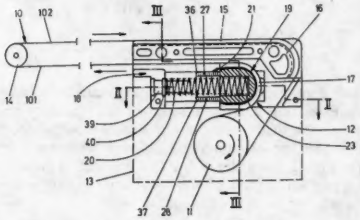
PCT No. PCT/DE87/00541, § 371 Date Sep. 19, 1989, § 102(e) Date Sep. 19, 1989, PCT Pub. No. WO88/07489, PCT Pub. Date Oct. 6, 1988

PCT Filed Nov. 21, 1987, Ser. No. 427,856

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1987, 3710044

Int. Cl.[5] B65G *23/44*

U.S. Cl. 198—814 **8 Claims**



1. A conveyor comprising an endless flexible conveying element; means for driving said conveying element; means for reversing a direction of movement of said conveying element; and at least one means for tensioning said conveying element, said tensioning means including a housing having opposite side walls, each of said opposite side walls having a longitudinal inner edge; a tensioning element engaging the conveying element and formed as a carriage displaceable between said opposite side walls; a tension spring for biasing said tensioning element into engagement with said conveying element; and a unidirectional blocking mechanism including a first group of stationary locking teeth formed in said housing and a second group of locking teeth connected with said carriage for joint displacement therewith, each tooth of said first and second groups of teeth having a lateral side which extends transverse to a direction of displacement of said carriage at an acute angle to a tensioning direction of said carriage, and a manual unlocking key supported on said carriage and carrying said second group of locking teeth, said manual unlocking key being laterally movable relative to a displacement direction of said carriage; one of said side walls defining a longitudinal guide having an opening, said tensioning device further comprising a pressure spring supported in said carriage for biasing said unlocking key in a direction transverse to the displacement direction of said carriage outward through said opening in said longitudinal guide; said first group of locking teeth including two laterally spaced rows of locking teeth formed on the inner longitudinal edge of said one side wall, said carriage having a side surface facing said two rows of locking teeth of said first group of locking teeth, and a recess, said unlocking key having a transverse web engaged in said recess, and said second group of locking teeth comprising at least two spaced locking teeth formed on said transverse web for engaging said two rows of locking teeth of said first group of locking teeth, respectively.

4,995,507

TICKET DISPENSING STRUCTURE

Christopher E. Schafer, R.R. 2, Adair, Iowa 50002

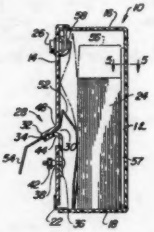
Filed Dec. 16, 1988, Ser. No. 285,682

Int. Cl.[5] B65D *83/12, 35/07*

U.S. Cl. 206—39.7 **2 Claims**

1. A dispenser for series-connected tickets comprising a structure having front, rear, side, top and bottom walls for containing a quantity of such tickets, means in the rear wall

providing a transverse ticket-exit slot through which the tickets are extracted via rearwardly directed manual force applied to the leading ticket, said rear wall being movable away from the remainder of the structure to provide access to the interior of the structure, means for selectively connecting and disconnecting the rear wall to and from the remainder of the structure and including a security lock cooperative between the rear



wall and another wall of the structure, said lock including a portion extending into the interior of the structure in spaced relation to the ticket-exit slot and exposed to the quantity of tickets within the structure, and deflector means integral with and projecting inwardly from the rearwall adjacent to the interior portion of the lock for preventing tickets form engaging the interior portion of the lock.

4,995,508

DISPLAY CASE FOR SPORTSCARDS

David A. Burley, 2505 Wisconsin Ave., N. Muskegon, Mich. 49445

Filed Jan. 10, 1990, Ser. No. 462,488
Int. Cl.[5] G09F *1/10*; B65D *1/34*
U.S. Cl. 206—44 B **5 Claims**

1. A tray comprising a plurality of cassette box lids, means for fastening the lids together so that each lid in a longitudinal row is placed upside down and overlaps an adjacent lid at an approximately forty five degree angle to form a plurality of pockets.

4,995,509

DISPLAY TOOTHBRUSH SANITIZING AND STORAGE DEVICE

Joseph Kornfeind, 124 Hillcrest Dr., Coplay, Pa. 18037

Filed Apr. 30, 1990, Ser. No. 516,543
Int. Cl.[5] B65D *25/20*
U.S. Cl. 206—209.1 **5 Claims**

1. A disposable device for simultaneously storing and cleaning a toothbrush, said toothbrush having an end body portion and bristles affixed to said end body portion comprising:

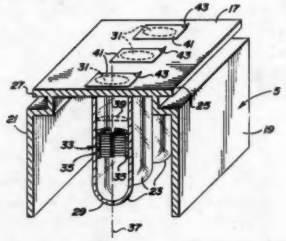
a. a first support means for supporting the device on a surface;

b. a disposable toothbrush storage means removably mounted on the first support means, for receiving one or more toothbrushes;

c. said toothbrush storage means comprising one or more downwardly extending tubular toothbrush receptacles, each receptacle further comprising;

i. a closed bottom end and an open top end;

ii. bristle means within each receptacle, having oppositely spaced, flexibly deformable bristle arms extending in-



wardly to meet at about a vertical centerline of said receptacle, for continuously contacting the bristles and end body portion of a toothbrush during insertion and withdrawal of a toothbrush into said receptacle;

iii. Liquid disinfectant within each receptacle to a level to substantially cover said bristle means; and

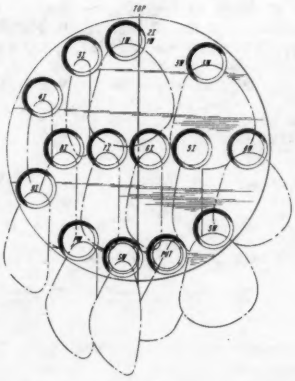
iv. a strippable cover means secured to the open end of each receptacle, for retaining the disinfectant therein, until a toothbrush is inserted into said receptacle.

4,995,510

CLUB-SEPARATING INSERT SYSTEM FOR GOLF BAGS

Carl C. Fletcher, Jr., 717 Winding Way, Bartlesville, Okla. 74006

Filed Mar. 21, 1985, Ser. No. 714,479
Int. Cl.[5] A63B *35/00*
U.S. Cl. 206—315.6 **7 Claims**



1. A process of designing and producing a club-separating insert system for a golf bag to arrange a set of golf clubs in a pattern of groups convenient for normal play and to provide maximum effective clearance between the heads of said clubs when inserted in said bag, comprising the steps of:

(a) projecting the plan view contour of each club head onto a horizontal plane and determining the locus of maximum expected rotation movement of each said contour in a

horizontal plane when said clubs are inserted vertically into suitable apertures,

(b) determining the vertical height of each club head from the end of the club handle,

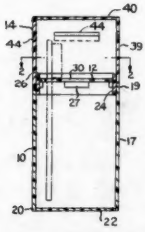
(c) preparing at least one insert for said golf bag containing a plurality of apertures for each golf club of the set, said apertures being positioned in groups and spaced within groups at intervals, at least some of which non-uniform, so as to maximize the effective clearance between the club heads while said golf bag is in use, as determined by the lateral and vertical separation between said club heads and the rotational and vertical motion of said club heads while said golf bag is in use, and to group together the types of clubs most often used in each phase of play.

4,995,511

TOOTHBRUSH AND TOOTHPASTE HOLDER

Marilyn B. Evans, 200 W. Arbor Vitae #10, Inglewood, Calif. 90301

Filed Jun. 1, 1990, Ser. No. 531,759
Int. Cl.[5] B65D *85/00*
U.S. Cl. 206—362.1 **3 Claims**



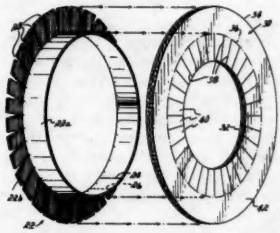
1. A free-standing covered container for storing toothbrushes, comprising a first elongated plastic tube having an upper end and a lower end; a flat plastic walls element closing the lower end of said tube; a second relatively short plastic tube telescopically inserted into the upper end of the first tube, said second tube having an outer surface adhesively secured to the inner surface of said first tube, said second tube having an upper end extending above the upper end of the first tube so that an outer side surface of the second tube is exposed; a multiple number of ledge elements secured to the inner surface of said second tube at regularly-spaced points therearound; a flat plastic plate removably fitting within the second tube on the ledge elements; said plastic plate having a centrally located hole therethrough adapted to accommodate the fingers of a person's hand for removing the plate from within the second tube; said plate having a multiple number of openings located near its peripheral edge and adapted to individually receive the handle portions of toothbrushes, whereby the brush portions of the toothbrushes are located above the plate; and a cover for the container, said cover comprising a third plastic tube having the same diameter as the first tube, and a second flat plastic wall element closing one end of said third tube with the other end left open; said cover being adapted to have its other end inserted onto the container so that an inner surface of the third plastic tube is in frictional facial contact with the exposed side surface of the second tube; said third plastic tube having an outer side surface that forms a smooth planar continuation of the outer surface of the first tube when the cover is positioned on the container; and a multiple number of vent slots extending through the wall of the third plastic tube, each vent slot extending angularly through the tube wall, each vent slot being narrower than the wall thickness of the third plastic tube so that the slots are relatively inconspicuous.

4,995,512

INTERIOR CORE PROTECTOR

Henry L. Liebel, Cincinnati, Ohio, assignor to Shippers Paper Products Company, Loveland, Ohio

Filed Jun. 5, 1990, Ser. No. 533,460
Int. Cl.[5] B65D *85/66*
U.S. Cl. 206—396 **9 Claims**



1. An interior core protector for positioning about the inner circumference of a coil of material having a core to protect the material from damage, comprising:

a rigid preformed angle having a first leg and a second leg generally at right angles one to another and a pair of opposed ends,

said first leg being bendable whereby said opposed ends may be brought together to form an annulus,

said second leg having a plurality of spaced cuts therein extending from the apex of said right angle to the outer edge thereof,

the length of said angle being such that the diameter of said annulus is substantially at least as great as the diameter of the core,

the spaces between said cuts in said second leg widening on bending of said first leg permitting bending of said angle to conform to the circumference of the core,

an annular retainer disk having an inner diameter, an outer diameter, and an intermediate diameter therebetween, said intermediate diameter defining an annular fold line equal in diameter substantially to the diameter of the annulus formed by said first leg of said rigid preformed angle and substantially to the diameter of said core,

said disk having a plurality of spaced cuts therein extending from said inner diameter to said intermediate diameter,

said disk being receivable on said first leg of said preformed angle when said first leg is bent to an annulus, the material between said spaced cuts in said disk being folded to a right angle to lie against said first leg of said angle, the material between said intermediate diameter and said outer diameter lying against said second leg of said angle so that when said interior core protector is operatively positioned in a coil of material the space between each cut in said second leg of said angle is covered by said disk and the space between each cut in said disk is covered by said first leg of said angle to provide protection for the coil of material around substantially the entire circumference of the core.

4,995,513

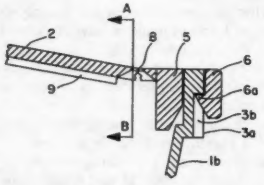
CONTAINER FOR OBLONG ARTICLES

Peter Rösler, Wangen, Fed. Rep. of Germany, assignor to Rose-Plastic GmbH, Hergensweiler, Fed. Rep. of Germany

Filed Apr. 12, 1990, Ser. No. 508,935
Claims priority, application Fed. Rep. of Germany, Apr. 13, 1989, 8904671[U]
Int. Cl.[5] B65D *85/24*
U.S. Cl. 206—446 **12 Claims**

1. In a container for oblong articles, the container including a lower part having a bottom wall, two side walls extending from the bottom wall and diverging at the same angle and two end walls extending from the bottom wall and connecting the

side walls, the end walls and the side walls having upper edges, the container further including a cover for closing the opening formed by the upper edges of the side walls and the end walls, the cover having an inner surface facing the lower part and a longitudinal axis, the cover being attached through a hinge at one of the end walls, the, cover being pivotable between a closed position and an open position, the cover being in a locking engagement with the end wall opposite the hinge when the cover is in the closed position, the improvement comprising the end walls of the lower part diverging from the bottom wall essentially at the same angle as the side walls, each side wall having above half the height thereof and at an outer surface thereof a projecting wall portion which defines two lateral projections which extend downwardly from the upper edge, of the end wall and a recess, with upper sides defined between the projections, the upper sides of the recess being spaced from the upper edge of the end wall, a tongue extending upwardly from the upper edge of each end wall in a middle portion thereof above the recess, the cover having at both ends



thereof a web which projects essentially perpendicularly from the inner surface of the cover and extends transversely of the longitudinal axis of the cover, wherein, when the container is closed, a wall surface of the web facing the end wall is in contact with an inner surface of the end wall of the lower parts, the cover additionally having at each end and at the inner surface thereof and outwardly in longitudinal direction of the cover from the web a flange which projects essentially perpendicularly and extends parallel to the web, the flange being of resilient or flexible material and, when the cover is in the closed position, a wall surface of the flange facing the interior of the lower part being in contact with outer surfaces of the wall portions projecting from the end walls, the flange having a projecting nose directed toward the end wall of the lower part, the nose being movable into the recess defined between the lateral projections for obtaining a locking engagement with the upper side of the recess, and a slot being defined in the cover between each rib and flange for receiving the tongues which project upwardly from the upper edge of the end wall.

4,995,514

METHOD AND MEASUREMENT SYSTEM FOR THE PRODUCTION OF GARMENT KITS

Horst Forschner, Scheffelstrasse 4, D-8011 Kircheim, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 115,007, Oct. 28, 1987, Pat. No. 4,860,900. This application Apr. 13, 1989, Ser. No. 337,357

Int. Cl.[5] **A41H** *3/08;* **B65D** *85/00*

U.S. Cl. 206—574 **20 Claims**

1. A process for the manufacture of industrially prefabricated garment kits, the garment kits being for the self-assembly of garments by consumer-wearers, said garment kits for being made in a range of sizes, each of said sizes within said range of said sizes having a corresponding plurality of measurements associated therewith, said process comprising the steps of:

dividing said range of said sizes into a plurality of subranges of said sizes, said subranges of said sizes being consecutive and, in total, covering said range of said sizes;

each of said subranges of said sizes extending over a plurality of said sizes, and at least two of said consecutive subranges of said sizes overlapping such that each of said at least two consecutive overlapping subranges of said sizes encompass at least one common size;

selecting, for each of said subranges of said sizes, at least one of said corresponding plurality of measurements to be common to each of said plurality of sizes over which said each subrange of said sizes extends;

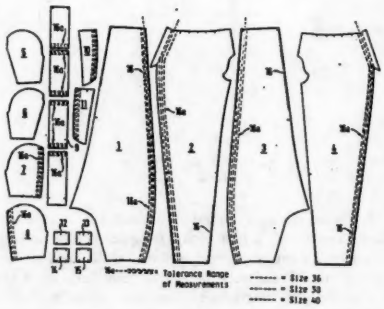
dimensioning a fabric according to said corresponding plurality of measurements of at lest one of said sizes, including said common measurement; and

marking the fabric with sizing indicia according to said corresponding plurality of measurements of at least one of said sizes, including said common measurement.

10. A process for the manufacture of industrially prefabricated fabric garment kits, said garment kits being for the self-assembly of garments by consumer-wearers, said garment kits for being manufactured from fabric in a limited plurality of sizes, each of said limited plurality of sizes being determined by a corresponding plurality of measurements, said process comprising the steps of:

selecting at least one measurement of each said corresponding plurality of measurements to be common to each of said limited plurality of sizes;

dimensioning a fabric according to at least one of said corresponding plurality of measurements of at least of said sizes, including said common measurement; and



marking said fabric with sizing indicia corresponding to said corresponding plurality of measurements of said limited plurality of sizes, including marking with fabric with said common measurement that is common to each of said limited plurality of sizes.

15. A plurality of prefabricated garment kits, said plurality of garment kits being for the self-assembly of garments by consumer-wearers, in a range of sizes, each of said sizes within said range of sizes having a corresponding plurality of measurements associated therewith, each of said plurality of garment kits comprising:

fabric marked thereon sizing indicia for a subrange of said range of sizes, said subrange of said range of sizes comprising a plurality of sizes of said range of sizes, said sizing indicia comprising markings indicated at least some of said corresponding plurality of measurements for each of said plurality of sizes of said subrange of said range of sizes; and

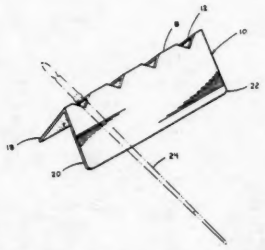
at least one common sizing indicia marked on said fabric, said common sizing indicia being common to and substantially the same for each of said plurality of sizes of said subrange of said range of sizes.

4,995,515

FINE ARTIST PAINT BRUSH REST

Timothy C. Smith, 1924 University Ave., Berkeley, Calif. 94704

Filed Feb. 6, 1989, Ser. No. 307,694
Int. Cl.[5] A47F *7/00*
U.S. Cl. 211—65 **1 Claim**



1. A fine artist paint brush rest made from a single blank of stamped, formed, thin durable aluminum comprising:

an extended A-frame configuration having a single bend therein, said bend forms the apex of said A-frame, a first side of said A-frame comprising a plane having an upper edge and a lower edge, a second side of said A-frame having an upper edge and a lower edge, the two upper edges joined at said single bend, a plurality of notches located along the length of said single bend, said notches extending partially down each side of said A-frame, said lower edges resting on a support surface to provide a means for supporting a plurality of paint brushes in said notches.

4,995,516

CLOTHES HANGER STRUCTURE

James M. Fine, P.O. Box 330489, Miami, Fla. 33233

Filed Nov. 13, 1989, Ser. No. 434,710
Int. Cl.[5] A47F *5/08*
U.S. Cl. 211—87 **1 Claim**

1. A hanger structure designed to support clothes or like articles from a wall mounted hook closely adjacent a ceiling surface above the hook and within the locker, said hanger structure comprising:

a. a support arm having a first end and a second end and having an elongate configuration of sufficient length and shape to hold an article of clothing thereover,

b. said first end of said support arm comprising a free end having a mounting means formed thereon and structured for removable attachment of said hanger structure to the hook,

c. said mounting means and said support arm cooperatively disposed and configured to dispose said support arm in an operative position when said mounting means is attached to the hook,

d. said operative position defined by an outwardly extending substantially horizontal orientation of said support arm relative to the wall on which the hook is mounted and closely adjacent the locker ceiling,

e. a body portion connected to said support arm in spaced relation to said mounting means,

f. said body portion extending from the second end of said support arm outwardly therefrom and away from said mounting means when said support arm is in said operative position,

g. said body portion being disposed and configured in coplanar disposition with said support arm and mounting means and said body portion depending downwardly from said support arm when said support arm is in said operative position,

h. said support portion comprising a handle means for carrying the support arm and an article of clothing thereon when not attached in said operative position to the hook,

i. said handle means being configured for gripping by the hand of a user and orienting said support arm in an inverted position when so gripped,

j. said handle means comprising a supporting hook configured to removably support the support arm and an article of clothing thereon to a horizontally oriented clothes rod when in said inverted position relative to said operative position,

k. said support arm comprising a substantially straight line configuration along its length and said body portion secured to said support arm at the second end thereof relative to said supporting means being spaced from said support arm along a major portion of the length of said support arm,

l. said support arm being configured to engage the article of clothing on a first exposed surface extending along the length of said support arm when in said operative position and on a second exposed surface extending along the length of said support arm and oppositely disposed to said first surface when said support arm is in said inverted position,

m. said mounting means comprising an outwardly extending angularly oriented finger extending from said first exposed surface away from said handle means,

n. said mounting means comprising an elongate recess dimensioned and configured to receive an outer free end of the locker hook therein so that said support arm and said body portion extend transversely outwardly from the hook structure and in cantilevered attachment thereto when in said operative position within a locker, and said channel is formed within and extends along a length of said finger integrally formed on said free end of said support arm.

4,995,517

MECHANISM FOR SUPPRESSING VIBRATIONS OF TRAVELLING CRANE

Yoshimi Saotome, Takasago, Japan, assignor to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Apr. 30, 1990, Ser. No. 516,731
Claims priority, application Japan, Oct. 14, 1989, 1-267771
Int. Cl.[5] B66C *13/06, 23/26;* F16D *31/62*
U.S. Cl. 212—146 **1 Claim**

1. A mechanism for suppressing vibrations in travel of mobile type crane, comprising:

a vehicle body;

a boom pivotally mounted on said vehicle body;

a boom lifting hydraulic cylinder with a first load-supporting oil chamber and a second opposingly located oil chamber, said cylinder being connected between said vehicle body and said boom of the mobile crane;

a main hydraulic pump;

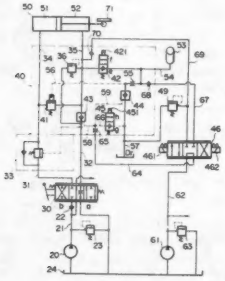
an auxiliary hydraulic pressure source;

a direction control valve connected between said boom lifting hydraulic cylinder and said main hydraulic pump and comprising means for supplying the discharge oil of said main hydraulic pump selectively to and from said first

load-supporting oil chamber and said opposingly located second oil chamber of said boom lifting cylinder;

a vibration suppressing accumulator connected between said boom lifting cylinder and said direction control valve;

a first change-over valve connected between said boom lifting cylinder and said direction control valve and comprising means for selectively switching between a travel mode position for forming a closed circuit through said first and second oil chambers and a working mode position for supplying oil pressure from said direction control valve independently to and from said first and second oil chambers;



a second change-over valve selectively switchable between a travel mode position for communicating said accumulator with said closed circuit and a working mode position for blocking oil flow from said closed circuit to said accumulator;

a boom position detecting means operative to actuate one of said change-over valves when a predetermined position of said boom is detected;

a first selector means for switching on and off oil pressure supply to said oil chamber from an auxiliary oil pressure source; and

a second selector means for switching on and off oil pressure supply to said accumulator from an auxiliary oil pressure source.

4,995,518

DETACHABLE FLOATING COUNTERWEIGHT

James R. McGhie, 4362 Metcalf Dr., Eagan, Minn. 55122

Filed Aug. 11, 1989, Ser. No. 392,470

Int. Cl.[5] B66C *23/74*

U.S. Cl. 212—178 **17 Claims**

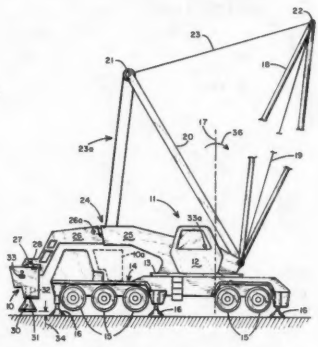
9. A combination crane assembly and detachable counterweight for counterweighting said assembly comprising

(a) a crane having a platform pivotably mounted about a vertical axis supported by a ground-borne base, the platform further having a lifting means and a counterweight arm extending radially and opposingly outward from said platform, relative to said lifting means;

(b) a counterweight having a substantial mass and a base, the base extendably attached to said mass and having a frustoconical shape for supporting the counterweight, the counterweight further having means for controllably extending said base therefrom;

(c) a connection means for attaching said counterweight proximate the end of said arm, said connection means including a linkage for suspending said counterweight beneath the underside of said arm;

(d) a control means for operating said counterweight including at least means for extending said counterweight base



to contact the ground to unload the weight of suspension of said counterweight beneath said arm.

4,995,519

AMPOULES

Howard Rose, 55A Popes Avenue, Strawberry Hill, Twickenham, Middlesex TW2 5TD, and Ian G. C. McAffer, Westerham, both of Great Britain, assignors to Howard Rose, United Kingdom

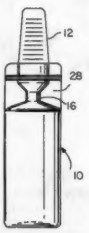
Filed Jan. 26, 1989, Ser. No. 301,685

Claims priority, application United Kingdom, Jan. 26, 1988, 8801655

The portion of the term of this patent subsequent to Dec. 25, 2007, has been disclaimed.

Int. Cl.[5] A61J *1/06*

U.S. Cl. 215—32 **12 Claims**



1. A plastic ampoule having an internal cavity, an opening to said internal cavity and a removable head sealing said opening, said opening comprising a dispensing neck extending from said internal cavity towards a mouth of said opening and adapted to receive a syringe head; the improvement comprising:

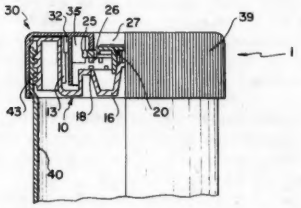
said opening further comprising a funnel between said dispensing neck and said mouth, said funnel having an aperture with an internal diameter which is at least $\sqrt{3}$ times the minimum diameter of said dispensing neck to facilitate engagement of said syringe head with said dispensing neck by providing a protected docking target for said syringe head.

4,995,520

SAFETY CAP

Evans Santagiuliana, Vicenza, Italy, assignor to Taplast SNC di Evans Santagiuliana & C., Vicenza, Italy

Filed Dec. 30, 1988, Ser. No. 292,535
Claims priority, application Italy, Jan. 11, 1988, 85501 A/88
Int. Cl.[5] B65D *55/02*
U.S. Cl. 215—220 10 Claims



1. A safety cap for a container having an essentially cylindrical shape, said cap comprising:

an inner element having a thread and two concentric rings connected together through a flat ring, the outer ring has a thread while the inner ring has elastic notches and a closed button with a central frustum shaped indentation and another toroid indentation concentric therewith, the toroid indentation having a flat annular surface with frontal teeth thereon;

an outer element placed over the inner element, said outer element having a generally flat surface with a through hole defined therein;

means provided on the inner element and outer element for rigidly connecting the inner and outer element when the cap is turned in a tightening direction;

a central push button positioned between the inner element and the outer element, said central push button being lodged within the through hole of the outer element; and

means provided on the central push button, the inner element and the outer element for rigidly connected the inner and outer element when the cap is turned in an untightening direction and when axial pressure is applied to the central push button.

4,995,521

STOPPER FOR INFUSION AND TRANSFUSION BOTTLES

Alfred von Schuckmann, Kevelaer, Fed. Rep. of Germany, assignor to Pohl GmbH & Co. KG, Karlsruhe, Fed. Rep. of Germany

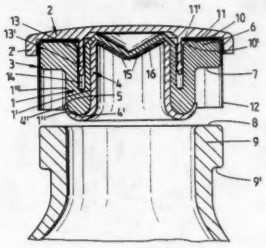
Filed Feb. 21, 1989, Ser. No. 314,469
Claims priority, application Fed. Rep. of Germany, Mar. 3, 1988, 3806875
Int. Cl.[5] B05D *51/20*
U.S. Cl. 215—249 13 Claims

1. A closure stopper, in particular for bottles and the like containing infusion solutions, comprising

an elastic stopper part which is insertable in sealing fashion into a bottle neck and which has a resting shoulder adapted to rest on the bottle neck,

a cover part having a flange projecting downwardly therefrom, and the stopper part being formed with a recess extending substantially lower than said resting shoulder for entrance in said recess of said flange of the cover part extending downwardly beyond the resting shoulder and forming a removable clamping insertion connection with the stopper part, and

a flanged cap having an annular-shaped neck, the neck extending crosswise to said flange and being clamped between a top side of the resting shoulder of the stopper part and a bottom side of said cover part, said flanged cap comprising an outer peripheral portion extending from said neck and having a lower end region for extending around the bottle neck and being rolled in below an inwardly recessed edge of the bottle neck for clamping said



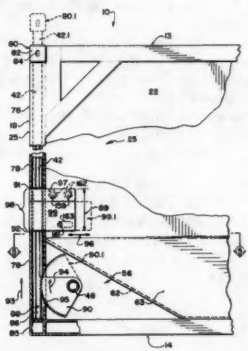
stopper part in cooperation with said neck, and sealing the stopper part in the bottle neck.

4,995,522

BOTTOM DUMPING BULK CONTAINER APPARATUS

Fraser M. Barr, 3916 Sharon Place, West Vancouver, British Columbia, Canada (V7V 4T6)

Filed Apr. 24, 1989, Ser. No. 341,976
Int. Cl.[5] B65G *67/58*
U.S. Cl. 220—1.5 21 Claims



1. A container apparatus having:

(a) generally horizontal, spaced apart, top and bottom walls, and vertical walls connecting the top and bottom walls to define an interior of the container apparatus, the bottom wall having at least one discharge opening therein communicating with the interior,

(b) at least one door means for opening and closing the discharge opening, the door means being mounted adjacent the bottom wall of the container and being moveable relative to the discharge opening,

(c) actuating means for controlling opening and closing of the discharge opening, the actuating means cooperating with, and being mounted for vertical movement relative to, the container apparatus, the actuating means having an upper end portion which includes connection means for connecting to twist lock devices, hooks or dogs of a container lifting apparatus,

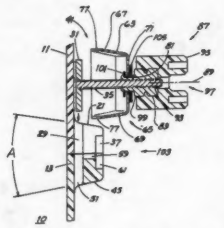
(d) transmission means for moving the door means in response to the said vertical movement of the actuating means, the transmission means cooperating with the actuating means and the door means.

4,995,523

TANK CLAMPING MECHANISM

Gary L. Brooks, Lake Geneva, Wis., assignor to Sta-Rite Industries, Inc., Milwaukee, Wis.

Filed May 29, 1990, Ser. No. 530,113
Int. Cl.[5] B65D *45/16*
U.S. Cl. 220—4.12 **12 Claims**



1. An improved tank clamping mechanism comprising:

a first tank shell having a first flange protruding therefrom, the first flange including a first aperture configured to restrain an abutment member;

a second tank shell having a second flange protruding therefrom and positioned in general registry with the first flange, the second flange including a second aperture in general registry with the first aperture and configured to restrain the abutment member;

a clamping assembly including the abutment member received in the first aperture and the second aperture, the clamping assembly further including a clamp and adjusting means for adjustably moving the clamp relative to the abutment member;

the clamp being configured to engage the first flange and the second flange and urge the flanges toward clamped engagement with one another as the clamp is urged toward the abutment member;

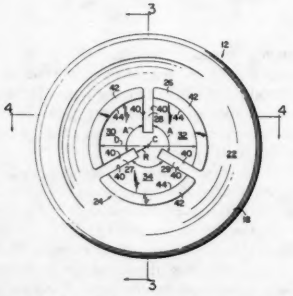
the tank shells thereby being clamped together for confining a pressurized medium therewithin.

4,995,524

DRIPLESS SAUCER

Franklin G. Welles, 458 Cricket Cir., Talcottville, Conn. 06066

Filed Apr. 2, 1990, Ser. No. 503,327
Int. Cl.[5] B65D *19/22, 23/06;* A47G *19/22*
U.S. Cl. 220—23.83 **10 Claims**



10. In combination with a cup having a generally annularly extending base depending from its bottom, a saucer comprising:

a base integrally formed with a continuous said wall extending about said base, said continuous side wall being disposed upwardly relative to said base at an angle;

a raised central portion integrally formed on said base and being spaced from said continuous side wall about its periphery to define a trough between said raised central portion and said continuous side wall;

said raised central portion having a plurality of substantially planar surfaces facing upwardly therefrom, each of said plurality of substantially planar surfaces being disposed in a common plane with one another above said base;

said plurality of planar surfaces being separated from one another by a plurality of inlaid channels which are configured to be directed radially outwardly and downwardly toward said trough initially from an area on the raised central portion lying generally symmetrically coincident with the center of said saucer, said area being defined by a fixed radius taken from the center of said saucer and being disposed within said common plane such that each of said inlaid channels has a substantially constant width and communicates between said trough and said common plane to allow liquid to pass from said plurality of substantially planar surfaces downwardly through said inlaid channels and into said trough; and

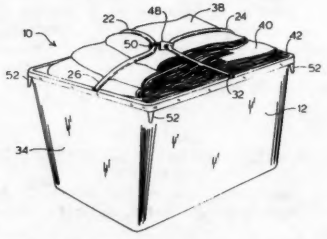
an interrupted rim extending generally circumferentially about said raised central portion and circumscribing a circle about said raised central portion having a diameter slightly larger than the outer diameter of said base of said cup such that said cup is securely supported on said saucer from below and along the sides of said cup base.

4,995,525

OPEN TOP CONTAINER WITH CONTAINMENT MEANS

Lawrence L. Kehrer, Rte. 6, Box 261, Chapel Hill, N.C. 27514

Filed Aug. 9, 1989, Ser. No. 391,450
Int. Cl.[5] B65D *51/26*
U.S. Cl. 220—85 R **18 Claims**



1. A container, comprising:

(a) a receptacle having an upper rectangular opening with four edges, four corner areas, and a central area;

(b) a first elongated element and a second elongated element, each of said elongated elements made of flexible, stretchable material having a first end and a second end, the first end of said first elongated element attached to a first edge of the upper rectangular opening and the second end of said first elongated element attached to a second edge of the upper rectangular opening that is perpendicular to the first edge, the first end of said second elongated element attached to a third edge of said upper rectangular opening and the second end of said second elongated element attached to a fourth edge of the upper rectangular opening;

(c) a means for releasably fastening said first elongated means to said second elongated means over the central area of said rectangular opening; and

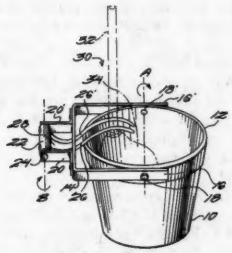
(d) a means for releasably holding each of said elongated elements to the corner area located between the ends of said elongated element.

4,995,526

SCRUBBING PAIL HANDLE

Warren B. Garrison, 6012 Hampton Ridge Rd., Columbia, S.C. 29209

Filed May 10, 1990, Ser. No. 521,735
Int. Cl.[5] B65D *25/00*
U.S. Cl. 220—94 R 20 Claims



1. A device for use in lifting a pail, said pail having a handle, and for use with a cleaning tool, said cleaning tool having a shaft and a cleaning head attached to said shaft, said cleaning head having a larger diameter than the diameter of said shaft, said device comprising:

gripping means for gripping said cleaning tool head and holding said cleaning tool head in said pail as said pail is lifted by lifting said shaft of said cleaning tool when said cleaning tool is gripped by said gripping means; and

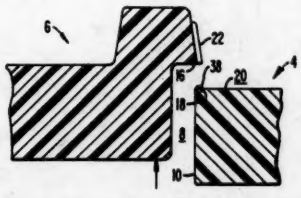
means for attaching said gripping means to said pail.

4,995,527

BREAKOUT PANEL FOR MOLDINGS

John A. Sauder, Watauga, and Harold Larson, Hurst, both of Tex., assignors to Tandy Corporation, Fort Worth, Tex.

Filed Jun. 2, 1989, Ser. No. 360,498
Int. Cl.[5] H02G *3/00*
U.S. Cl. 220—266 12 Claims



1. An improved molded part of the type including a body and a breakout element, the body having first and second surfaces and a third surface extending between the first and second surfaces, the third surface defining a breakout opening within which the element is generally situated, the improvement comprising:

the element having a first region;

the body having a second region;

the first and second regions being adjacent one another and defining a line of intersection having no substantial width thereby forming a zero landed intersecting edge; and

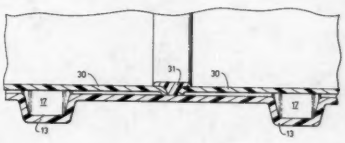
a frangible pad coupling the element and the body, the frangible pad sized to permit the element to be broken away from the body to expose the breakout opening, the frangible pad positioned so that substantially no scar material extends into the breakout opening after removal of the element.

4,995,528

RIBBED STORAGE TANK SYSTEMS WITH INTERIOR WALL SECTIONS FOR ENHANCED STRENGTH

Bruce R. Sharp, 22375 Edgewater Dr., Unit 241, Charlotte Harbor, Fla. 33980

Filed Jan. 19, 1990, Ser. No. 467,208
Int. Cl.[5] B65D *90/04*
U.S. Cl. 220—445 8 Claims



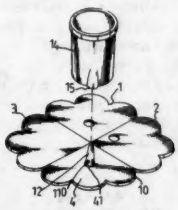
1. A ribbed storage tank system comprising a fibrous reinforced resinous storage tank having a cylindrical-shaped main body and a set of substantially uniformly spaced integral ribs extending circumferentially around the main body such that the exterior of the tank has the ribs protruding therefrom and the interior of the tank is generally contoured with rib recesses which represent the insides of the ribs, further wherein a series of wall sections are spaced laterally and circumferentially around the interior of the tank's cylindrical-shaped main body so as to extend across the rib recesses to cover each recess, each of said wall sections attached at its edges to the interior of the tank's main body and a midportion of the wall section remains at least partially separated from the interior and the rib recess of the tank's main body.

4,995,529

STRUCTURE OF GARBAGE CAN ASSEMBLY

Cheng-Hsien Sher, No. 18, Lane 195, Nan Tai Rd., Kaohsiung City, Taiwan

Filed Mar. 16, 1990, Ser. No. 494,348
Int. Cl.[5] A47F *5/02*
U.S. Cl. 220—475 9 Claims



1. A garbage can assembly comprising a plurality of support plates of similar construction, each of said plates including an upper substantially flat surface and a lower substantially flat surface and a pair of substantially straight sides extending at an angle to one other, each of said plates having a hole formed therethrough and extending between said upper and lower surfaces thereof, said plates being disposed in side-by-side relationship to one another, means for connecting adjacent sides of different plates to one another so that upper and lower surface of the plates are substantially flush with one another, fastening means disposed in the hole of one of said plates and extending upwardly therefrom, a garbage container for receiving garbage, said container including a lower portion having a laterally offset projection thereon, a downwardly facing opening being formed in said projection for receiving said fastening means, said holes being positioned such that when said fastening means is disposed within one of said holes, the container is held in operative position over the center of gavity of the connected support plates.

4,995,530

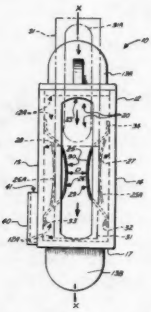
ADJUSTABLE DISPENSER FOR HOLDING BOXES OF PLASTIC BAGS

Carroll Tabor, 2502 Highway 1, Thibodaux, La. 70301-5843

Filed Dec. 1, 1988, Ser. No. 278,595

Int. Cl.[5] B65H *1/00*

U.S. Cl. 221—46 **7 Claims**



1. An adjustable dispenser container for holding a disposable box of plastic bags stored within the box, to be dispensed from the box via an elongated slot that extends substantially the length of the box, comprising:

(a) a housing having sidewalls, a bottom end wall, a top end wall and a longitudinal axis intersecting the bottom and top defining therewithin a hollow interior;

(b) one of the walls having an elongated dispensing housing opening therein communicating with the interior;

(c) adjusting spring means within the housing for frictionally holding the box with respect to the body in a position which registers the slot of the box with the opening of the housing so that plastic bags can be dispensed through the registered slot and opening; and

(d) the spring means comprising left and right opposed leaf springs, each having inwardly facing surfaces movable with respect to each other so that the width of the interior of the housing varies by automatic displacement laterally of the leaf springs over their length when the box is placed in the housing between the leaf springs, so that boxes of varying sizes can be contained in the housing; and

(e) the leaf springs being fixedly attached at one end portion to the housing and being free to move and displace at the opposite end portion thereof.

4,995,531

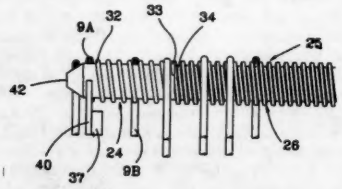
RING DISPENSER

Roger L. Summers, Alliance, Ohio, assignor to Bridgestone/-Firestone, Inc., Akron, Ohio

Filed Jun. 14, 1989, Ser. No. 366,044

Int. Cl.[5] B65G *33/02*

U.S. Cl. 221—75 **12 Claims**



1. A ring dispenser including:

(a) a rod having first and second ends and a helical thread formed thereon for separating and moving a plurality of rings along said rod toward the second end;

(b) means for rotatably supporting the first end of the rod whereby the second end is located generally above a ring receiving member;

(c) a motor for rotating the rod;

(d) sensor means located adjacent the second end of the rod for detecting the arrival of a ring at said second end and for stopping and starting the rotation of the rod to dispense a ring from the second end onto the ring receiving member;

(e) the rings each having a cross-sectional diameter so that the rings are supported between the crests of adjacent threads of the helical thread and are free of contact with the roots of the threads;

(f) a helical coil spring mounted on the rod and located between the second end of the rod and said helical threads; and

(g) the rings having a cross-sectional diameter less than the spacings between the individual convolutions of the coil spring so as to lie on the rod between the convolutions of the spring as the rings move along said rod toward the second end.

4,995,532

FLUID METERING APPARATUS FOR SUPPLYING FLUID OUT OF A STORAGE VESSEL TO A RECEIVER

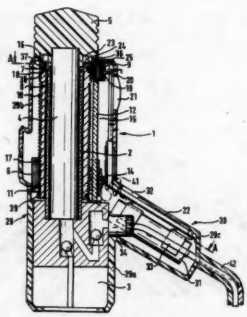
Erich Knödel, Wertheim am Main, Fed. Rep. of Germany, assignor to Walter Graf u.Co. GmbH & Co., Fed. Rep. of Germany

Filed Jan. 24, 1989, Ser. No. 300,978

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1988, 8800844[U]

Int. Cl.[5] G01F *11/04*

U.S. Cl. 222—43 **15 Claims**



1. A dispenser for precisely dispensing a predetermined volume of fluid from storage vessel into a recipient vessel, said dispenser comprising:

a housing (29) formed with a connector portion (29*a*) having valve chamber with a suction valve and a discharge valve therein;

a cylinder (2) mounted on the connector portion of said housing (29) and connected in a fluid tight manner to said valve chamber, which valve chamber is connected in a fluid tight manner to both the suction valve and the discharged valve;

a movable piston (4) in the cylinder and carrying an operating button (5) fixed on its end remote from the valve chamber;

a bush (8) threaded on its outer surface and slidably and rotatably mounted in a telescopic manner on the outer surface of the cylinder (2), said bush carrying an adjustable stop (6) in threaded engagement therewith, means far coupling the bush to the button (5) in an axially fixed and

freely rotatable manner on the end of the bush remote from the valve chamber;

a counter stop (7) fixed to the housing at an end portion remote from the valve chamber to provide an abutment for the adjustable stop; and

connecting means for rotationally coupling the button to the bush upon respective actuation of the connecting means, so that rotatinq the button (5) will rotate the bush (8) and thus axially displace the adjustable stop (6).

4,995,533

PRESSURE CAPSULE FOR SPRAY CAN, AND SPRAY CAN WHICH UTILIZES SUCH A CAPSULE

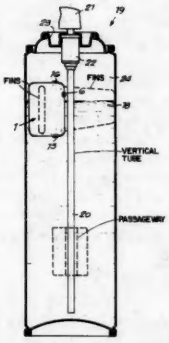
Alfons Vandoninck, Antwerpen, Belgium, assignor to Jaico C.V., Coöperatieve Vennootschap, Opglabbeek, Belgium

Filed Jun. 27, 1989, Ser. No. 371,842

Claims priority, application Belgium, Jun. 29, 1988, 8800747; Oct. 3, 1988, 8801131

Int. Cl.[5] B67D *5/08*

U.S. Cl. 222—54 **32 Claims**



1. In a spray can (19) having a liquid (18) to be expelled, a pressure capsule freely movable in the spray can during expulsion of the liquid, the capsule comprising first and second chambers (2, 3), the first chamber being filled with a first fluid under a first pressure and the second chamber being filled with a second fluid under pressure approximately equal to an overpressure present in the spray can for expelling the liquid (18), the first pressure being higher than the overpressure; a valve (4) in a wall of the first chamber (2); a membrane (5) forming a wall of the second chamber and controlling the valve (4); a removable element (6) for maintaining the valve (4) in a closed position when the removable element is in its nonremoved condition.

4,995,534

DETACHABLE VOLVED DISPENSING HEAD FOR BOTTLE

Richard O. Norman, San Antonio, Tex., assignor to TexPro, Inc., Burnet, Tex.

Filed Sep. 7, 1989, Ser. No. 404,173

Int. Cl.[5] B67D *5/60*

U.S. Cl. 222—511 **9 Claims**

1. Liquid dispensing apparatus for controllably dispensing pressurized liquid from a container, a discharge opening therefrom being located above the surface of the liquid contained within the container, comprising

an adapter for matingly sealably connecting with the discharge opening of the container, said adapter including a central opening,

an elongate tube insertable through said central opening of said adapter such that the lower end thereof is within the liquid,

an elastomeric resilient O-ring sealing against the outside surface of said tube near its upper end,

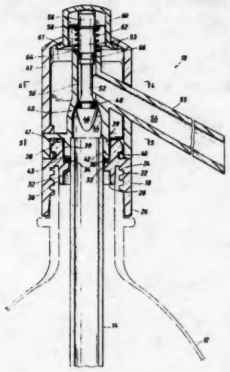
said adapter including a shoulder for limiting the downward location of said O-ring,

a dispensing valve housing seatably connectable to the top of said adapter and surrounding the top of said tube,

said housing having a valve chamber contiguous with the top opening of said tube, the walls of said chamber gradually reducing in dimension to form a valve seat at the upper end of said chamber,

said housing having a channel above said valve seat,

an elongate valve plunger having a bulbous lower closure end operably located within said chamber and with an external surface that diverges below said valve seat from



the adjacent wall of said chamber, said closure end having a contact seating surface above its maximum diameter dimension, said plunger having an elongate plunger shaft operating within said channel and connected to said bulbous lower end, said shaft being smaller in diameter than said channel,

bias means connected to said plunger for urging the plunger upward to close its closure end in said valve seat, and

a dispensing spout having an input opening into said channel, wherein downward pressure applied to said valve plunger overcoming said bias means causes the downward descent of said bulbous closure end into said chamber to provide an increasingly larger flow path between said walls of said chamber and said closure end for liquid drawn from the container depending on the increasingly downward position of said valve plunger.

4,995,535

NOZZLE DEVICE FOR DISCHARGING MOLTEN METAL

Satoshi Ooya; Sadanobu Sugiura, both of Anjo; Teruhisa Kawashima, Kariya, and Toshio Kawamura, Takahama, all of Japan, assignors to Toshiba Ceramics Co., Ltd., Tokyo, Japan

Filed Feb. 26, 1990, Ser. No. 484,543

Claims priority, application Japan, Apr. 21, 1989, 1-101914

Int. Cl.[5] B22D *37/00*

U.S. Cl. 222—607 **11 Claims**

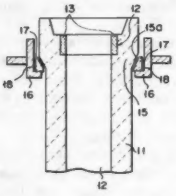
1. The nozzle device for discharging molten metal comprising:

a nozzle having a tapered portion whose outer diameter decreases toward the lower end;

a metal holder mounted on the tapered portion and supporting the nozzle; and

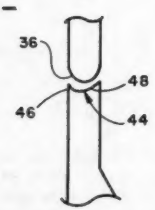
an annular receiving member consisting of a plurality of parts and interposed between the tapered portion and

metal holder, the annular receiving member being attached to the inner peripheral surface of the metal holder by an adhesive and having an inner peripheral surface



thereof extending along the outer peripheral surface of the tapered portion, and the annular receiving member being formed of Si_3N_4, Al_2O_3, ZrO_2, SiC, Al_2O_3-SiO_2, SiO_2, or MgO-Al_2O_3, or formed by a fine ceramic product.

4,995,536
SEWING NEEDLE WITH A THREADING ASSISTING FEATURE
Domenick Pennestri, 86 Mayloft Ct., Huntington Station, N.Y. 11746
Filed Oct. 17, 1989, Ser. No. 422,512
Int. Cl.[5] D05B *87/00, 85/00*
U.S. Cl. 223—102 **1 Claim**



1. A sewing needle having a body with a point on one end and a head on another end and an eye located adjacent to the head and comprising:

(A) a body outer surface;

(B) a slot extending through said body from said body outer surface into the eye, said body having an inner surface adjacent to said eye, said slot

(1) being continuous and uninterrupted from an entrance section located in said body outer surface to an exit section located in said inner surface in said eye, and

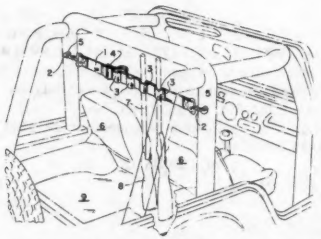
(2) having said entrance section larger than said exit section;

(C) said body including a top wall adjacent to said slot and the needle head and a lower wall adjacent to said slot and below said top wall, said top and bottom walls being in confronting relationship with each other;

(D) said top wall being curved continuously from said outer surface to said inner surface with a single radius of curvature and being convex as viewed from said bottom wall; and

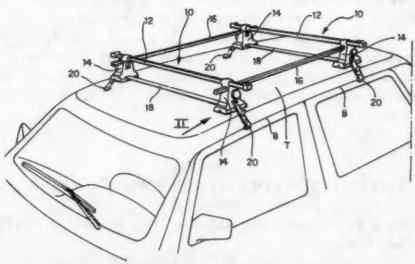
(E) said bottom wall being curved from said outer wall to said inner wall and being concave as viewed from said top wall, said bottom wall including a first curved section and a second curved section with said first curved section intersecting said body outer surface and said second curved section intersecting said body inner surface adjacent to said eye, said first curved section being curved on a radius of curvature which is less than a radius of curvature of said second section, said first curved section intersecting said second curved section at a location that is between said inner surface and said outer surface, each of said bottom wall curved sections being curved to a different degree from each other and to a degree which is different from the curvature of said top wall.

4,995,537
REMOVABLE GUN RACK
T. Mark Thedieck, 203 E. Monroe St., Thomasville, Ga. 31799
Filed Dec. 19, 1989, Ser. No. 452,416
Int. Cl.[5] B60R *7/14*
U.S. Cl. 224—273 **4 Claims**



1. A removable gun rack detachably mounted within a vehicle, comprising a belt extending transversely across the interior of the vehicle, first means connected to the belt intermediate the ends thereof for adjusting the length of the belt, to thereby facilitate the fitting of the gun rack to vehicles of various widths, second means connected to each end of said belt for detachably connecting each end of the belt to the vehicle frame above the vehicle floor, a plurality of fixed loops provided in said belt intermediate the ends thereof, and a gun, the barrel of said gun being insertable into a selected loop and the stock of said gun resting on the vehicle floor, whereby a plurality of guns may be transported in a substantially vertical position.

4,995,538
MOTOR VEHICLE ROOF RACK
Osvaldo Marengo, Turin, Italy, assignor to FAPA S.p.A., Turin, Italy
Filed Dec. 5, 1988, Ser. No. 279,631
Claims priority, application Italy, Dec. 4, 1987, 53864 B/87
Int. Cl.[5] B60R *9/00*
U.S. Cl. 224—329 **7 Claims**



1. A rack for a motor-vehicle roof having edge means comprising a pair of bridges each having a cross member, a pair of box-shaped feet for bearing on the roof and means for hooking and fixing each foot on to said edge means of the roof, said pair of feet having respective outer walls with an opening and upper parts with respective transverse passages, each cross member being slidably inserted in said respective transverse passages and pressure means being associated with each transverse passage for clamping the cross member in an adjusted position, wherein the hooking and fixing means of each said

bridge is comprised of an inextensible strap which passes through said opening in said outer wall of each foot and which is provided, outside said outer wall, with a rigid, shaped hook which is replaceable by other similar hooks of different shapes, for hooking on said edge means of the roof and at least one of said pair of feet incorporating tensioning means for tensioning the strap, said tensioning means comprising first and second rollers with longitudinal axes, the first roller being mounted for rotation about a fixed axis, a support mounted for rotation about said fixed axis and the second roller being mounted on said support which is movable transversely with the movement of the support being controlled by an irreversible screw and female thread assembly, said strap extending along an S-shaped path around said first and second rollers.

4,995,539

METHOD AND APPARATUS FOR CLEAVING WAFERS

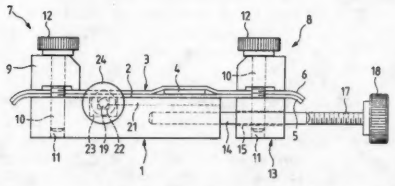
Heinz Richard, Schutzenmattstrasse 29, CH-8802 Kilchberg, Switzerland

Filed Sep. 13, 1989, Ser. No. 406,943

Claims priority, application European Pat. Off., Oct. 10, 1988, 88810694.5

Int. Cl.[5] B26F *3/00*; B28D *5/00*

U.S. Cl. 225—2 **19 Claims**



1. A method for breaking a plate-like workpiece such as a semiconductor wafer, comprising the steps of:

(a) scribing one of a workpiece surfaces with at least one scribing line to define a plane where the workpiece is to be broken;

(b) making a sandwich by placing the workpiece between an upper and a lower elastomeric foil such that an adhesive disposed on the lower foils joins the non-scribed surface of the workpiece to the lower foil, the foils extending beyond the workpiece;

(c) stretching the two foils with the workpiece sandwiched in between, in excess of the limit of elastic deformation of the lower foil and of the upper foil; and

(d) applying an upward force to the non-scribed side of the sandwiched structure sufficiently so as to bend the workpiece, the plane of the radius of the bend being normal to any scribed lines on the convex side of the workpiece, such that the workpiece breaks into individual bars as determined by the scribed lines on the workpiece.

4,995,540

UNIT DOSAGE DISPENSER FOR DENTAL IMPRESSION MATERIALS

Laurence Colin, Box 301, Cross River, N.Y. 10518, and Edward R. Spehar, 49 Orion Way, Neshanic Station, N.J. 08853

Continuation of Ser. No. 129,070, Dec. 7, 1987, abandoned, which is a continuation-in-part of Ser. No. 23,838, Mar. 9, 1987, Pat. No. 4,753,536. This application Apr. 7, 1989, Ser. No. 334,817

Int. Cl.[5] B67D *5/56*

U.S. Cl. 222—132 **1 Claim**

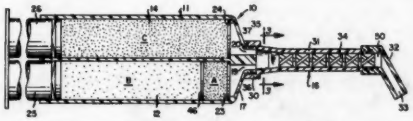
1. Apparatus for dispensing a unit dosage of elastomeric impression material for taking an impression in the oral cavity under aseptic conditions in the preparation of a dental restoration comprising:

a syringe having at least two elongated storage compartments laterally spaced apart with each compartment having a discharge end;

means for simultaneously applying pressure upon the opposite end of each compartment for discharging material from the discharge end of each compartment in common;

a nozzle assembly having a single nozzle for dispensing the materials discharged from said syringe, a head for coupling said nozzle assembly to said syringe, and a static mixing element in said nozzle for intermixing the materials fed to said nozzle;

a first impression material of relative low viscosity located in a first one of said storage compartments;



a second impression material of a substantially higher viscosity relative to the viscosity of said first impression material disposed in tandem with said first impression material in said first storage compartment;

a curing composition for said first and second impression materials located in a second storage compartment; and

means for separating said first and second impression materials for minimizing intermixing thereof during storage prior to use and during the sequential discharge of each material through said first storage compartment until one of said two impression materials is completely discharged from said storage compartment.

4,995,541

SET OF GUIDE ROLLS FOR GUIDING, POSITIONING AND CONTROLLING MOTION OF BANDS OF MATERIAL FED THROUGH THE ROLLS

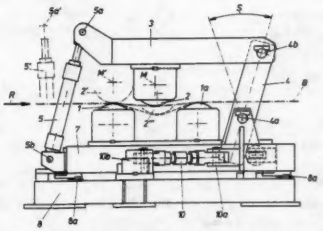
Gottfried Seidinger, Graz, Austria, assignor to Maschinenfabrik Andritz Actiengesellschaft, Graz, Austria

Filed Aug. 3, 1989, Ser. No. 389,358

Claims priority, application Austria, Aug. 4, 1988, 1969/88

Int. Cl.[5] B65H *23/26*

U.S. Cl. 226—174 **3 Claims**



1. Guide roll apparatus for guiding, positioning and controlling the motion of metal strips advanced in a direction through said apparatus comprising (1) a base frame having a supporting surface extending in a horizontal plane, (2) a pivotable frame supported by sliding means upon said supporting surface of said base frame and rotatable with respect to said supporting surface of said base frame about a vertical axis, (3) control cylinder means connected to said base frame and said pivotable frame and adapted to provide strip guiding motion transversely to the advancing direction of a strip by rotatably positioning said pivotable frame relative to said base frame, (4) two spatially arranged lower rolls having parallel horizontal axes and being rotably supported by said pivotable frame, (5) a third, upper roll having a corresponding parallel horizontal axis and being rotably supported in a frame that is superposed

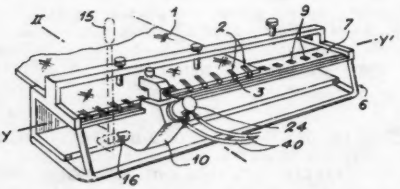
to said pivotable frame by means of articulated uprights at one end thereof and a pivotable pressure cylinder at the other end thereof, the uprights being double-armed levers pivotable about an horizontal axis to said pivotable frame, said pivotable cylinder also being articulated to said pivotable frame, and (6) a pivoting cylinder articulated at one end thereof to the lower end of each of the double-armed levers such that said pivotable axes of said double-armed levers are intermediate the lower ends about which the pivoting cylinders are articulated to the double-armed levers and ends about which the double-armed levers are articulated to the pivotable frame, the other end of each pivoting cylinder being articulated to the pivotable frame, said pivotable pressure cylinder and pivoting cylinders being operable to move said upper roll from a position between said lower rolls to a position directly above one of said lower rolls.

4,995,542

STAPLING APPARATUS FOR FIXING JUNCTION STAPLES ON THE END OF A CONVEYOR BELT OR THE LIKE

Jean-Francois Schick, Paris, France, assignor to GORO S.A., Chelles, France

Filed Apr. 9, 1990, Ser. No. 506,339
Claims priority, application France, Apr. 21, 1989, 89 05325
Int. Cl.[5] B25C *1/04, 5/16*
U.S. Cl. 227—112 **7 Claims**



1. A stapler apparatus for fixing on an end of a conveyor belt a row of junction staples provided with fastener clamps placed in a waiting position, by means of a working head slidably mounted on a guide plate provided for guiding said clamps and comprising on opposite sides of the row of staples having to be fixed a punch for driving-in the clamps and a movable die intended for folding down the clamp spikes, the apparatus further comprising a lead pawl for driving the working head in a stepwise motion in registry with the staples which have to be sequentially fastened, wherein:

the punch (13) for driving-in the clamps (4) and the bracket (25) c rying the movable die (11) are actuated by a sliding member (22) slidably mounted inside the working head (10), said sliding member (22) being driven by the piston (23) of a pneumatic or hydraulic actuator cylinder (24);

said sliding member (22) comprises two separate cams (33 and 36) for respectively driving the support (25) of the movable die (11) and the clamp-driving punch (13), the arrangement and the profile of said cams being such that the first cam (33) will operate at first for driving the movable die (11) downward before the second cam (36) raises the clamp-driving punch (13).

4,995,543

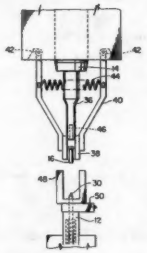
MAGNETIC STEM AND VERTICALLY FIXED POCKET DEVICE FOR A STATIONARY RIVETING MACHINE

Gordon C. Earl, 140 Sydenham St., Gananoque, Ontario K7G 1C2, Canada

Filed Mar. 23, 1989, Ser. No. 328,133
Int. Cl.[5] B21J *15/10*
U.S. Cl. 227—113 **5 Claims**

1. In a stationary riveting machine, apparatus for setting ferrous rivets having a head portion, a shank portion of smaller cross-section extending therefrom and an axis extending longitudinally of said shank, said apparatus comprising:

a descending riveting stem connectable to a plunger of said riveting machine, said stem having a shank and a riveting tip, at least a portion of the tip region of said being magnetic so as to support one said rivet in a head-up contact therewith; and



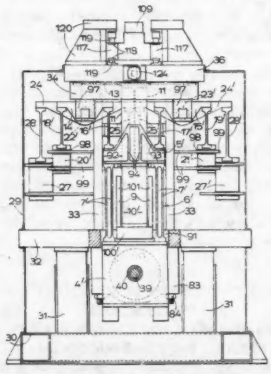
stationary means defining a vertically fixed pocket bore, said bore positioned in relation to said descending stem, for receiving rivets, in succession, from a rivet source, aligning each rivet in the path of said stem and releasing each rivet to said stem before said rivet contacts a pilot of an anvil of said riveting machine.

4,995,544

FRICTION WELDING APPARATUS

John G. Searle, Hednesford, England, assignor to Allwood, Searle & Timney (Holdings) Limited, England

Continuation-in-part of Ser. No. 340,723, Mar. 22, 1989, Pat. No. 4,905,883. This application Feb. 9, 1990, Ser. No. 478,133
Claims priority, application United Kingdom, Dec. 9, 1986, 8629390; Mar. 19, 1987, 8706581; PCT Int'l Appl., Dec. 7, 1987, PCT/GB87/00887
Int. Cl.[5] B23K *20/12*
U.S. Cl. 228—2 **19 Claims**



1. Apparatus for use in friction welding a first workpiece to a second workpiece, comprising driving means, reciprocatory means which is driven by said driving means and is operative in use to carry the first workpiece and to cause reciprocation of that first workpiece relative to the second workpiece such as will lead to the generation, between the workpieces, of frictional heat for welding, and balancing means comprising at least one counterweight and associated reversing means connected between the reciprocatory means and the counterweight in such a manner that movement of the reciprocatory

means in either direction causes simultaneous movement of the counterweight in the opposite direction, the apparatus being characterised in that said reversing means comprises a pivoted rocker, first linking means connected at one end to the reciprocatory means and at the other to the rocker, and second linking means connected at one end to the counterweight and at the other end to the rocker, and wherein guide means is provided, said guide means being operative to guide said counterweight for reciprocatory movement along a rectilinear path.

4,995,545

METHOD OF REINFORCING A STRUCTURE MEMBER

Joseph Wycech, Grosse Pointe Woods, Mich., assignor to Essex Composite Systems, Roseville, Mich.

Division of Ser. No. 166,282, Mar. 10, 1988. This application Dec. 12, 1988, Ser. No. 282,531

Int. Cl.[5] **B29C** *67/20*

U.S. Cl. 228—119 **15 Claims**

PREPARE SIDE A BY COMBINING A THERMOSETTING RESIN WITH A FILLER AND UNEXPANDED, THERMALLY EXPANDABLE MICROSPHERES
PREPARE SIDE B BY COMBINING A CURING AGENT WITH A FILLER AND A COLORANT
CLEAN HOLLOW STRUCTURAL MEMBER TO RECEIVE REACTIVE DOUGH
BLEND SIDE A WITH SIDE B AT A 4 TO 1 RATIO TO FORM REACTIVE DOUGH
PACK REACTIVE DOUGH INTO REGION OF HOLLOW STRUCTURAL MEMBER TO BE REINFORCED
SECURE CLOSURE PLATE ONTO HOLLOW STRUCTURAL MEMBER TO ENCLOSE REACTIVE DOUGH WHICH CURES IN PLACE

1. A method of preparing a composition for use in reinforcing a hollow structural member comprising the steps of:

combining a liquid thermosetting resin, a first filler and unexpanded, thermally-expandable microspheres;

blending said combination of said thermosetting resin, said first filler and said unexpanded, thermally-expandable microspheres to form a first dough;

the first dough including from about 5 to 99 percent by weight of the thermosetting resin, from about 0.1 to about 20 percent by weight of the unexpanded thermally-expandable microspheres and from about 0.5 to about 90 percent by weight of the first filler to provide a doughy consistency to the first dough;

combining a liquid curing agent, a colorant, and a second filler; and

blending said combination of said liquid curing agent, said colorant and said second filler to form a second dough;

the second dough including from about 10 to about 90 percent by weight of the curing agent adapted to promote cross-linking polymerization of the thermosetting resin in an exothermic reaction, and from about 0.5 to about 90 percent by weight of the second filler to provide a doughy consistency to the second dough.

7. A method of reinforcing a structural member having a cavity comprising the steps of:

preparing a first dough which includes a thermosetting resin, a first filler and unexpanded, thermally-expandable microspheres;

the first dough including from about 5 to 99 percent by weight of the thermosetting resin, from about 0.1 to about 20 percent by weight of the thermally-expandable microspheres and from about 0.5 to about 90 percent by weight of the first filler to provide a doughy consistency to the first dough;

preparing a second dough which includes a curing agent, a colorant and a second filler;

the second dough including from about 10 to about 90 percent by weight of the curing agent adapted to promote cross-linking polymerization of the thermosetting resin in an exothermic reaction, and from about 0.5 to about 90 percent by weight of the second filler to provide a doughy consistency to the second dough;

blending together said first dough and said second dough to form a reactive third dough; and

packing said reactive third dough in said cavity of said structural member;

wherein said curing agent promotes the cross-linking of said thermosetting resin in a reaction which releases heat, wherein said heat of said reaction causes said unexpanded, thermally-expandable microspheres to expand such that said reactive dough expands, and wherein said cross-linking of said thermosetting resin continues until said thermosetting resin substantially cures to form a rigid body which adheres to and reinforces said structural member.

4,995,546

DEVICE MOUNTING

John C. Regnault, Woodbridge, England, assignor to BT&D Technologies Limited, England

Filed Oct. 18, 1989, Ser. No. 424,236

Claims priority, application United Kingdom, Mar. 31, 1988, 8807729

Int. Cl.[5] **H01L** *21/60;* **H01S** *3/02;* **B23K** *101/40*

U.S. Cl. 228—123 **12 Claims**

1. A method of manufacturing a semiconductor device having a semiconductor element bonded to a first surface of a first package element and a second surface of the first package element bonded to a second package element, the method comprising:

applying a layer of fusible alloy solder to the first surface of the first package element,

applying a fusible alloy solder layer to at least one of the second surface of the first package element and a second package element surface which is to be bonded to the first package element,

interposing the first package element between the semiconductor element and the second package element, and

applying heat to melt the fusible alloy solder layers and bond the semiconductor element and second package element to the first package element in a single heating operating.

4,995,547

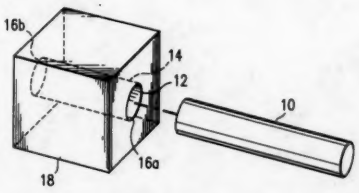
PROCESS FOR BRAZING A METAL OBJECT TO A CERAMIC SURFACE DEFINING A HOLE FOR RECEIVING THE METAL OBJECT

W. Peter Schubert, Lafayette, and Thomas A. Wilke, Boulder, both of Colo., assignors to Paradygm Science & Technologies, Inc., Boulder, Colo.

Filed Jun. 4, 1990, Ser. No. 532,590

Int. Cl.[5] **B23K** *1/19, 31/02, 103/16*

U.S. Cl. 228—124 **18 Claims**



1. A method for brazing a piece of metal material to a surface defining a recess in a piece of ceramic material, comprising:

providing a metal object;

providing a ceramic object having a surface that defines a recess for receiving said metal object;

providing brazing material;

positioning said metal object in said recess of said ceramic object, wherein a space is defined between said metal object and said surface, said space providing substantial resistance to the removal of oxygen therefrom;

positioning said brazing material to substantially fill said space and establish a joint between said metal object and said surface of said ceramic object when said brazing material is heated to its melting point;

positioning a material having an affinity for oxygen adjacent to said space to attract oxygen from said space; and

heating said metal object, said ceramic object, and said brazing material to braze said metal object to said surface of said ceramic object.

4,995,548

PREPARATION PROCESS FOR COEXTRUSION BILLETS WITH MULTIPLE METALLIC CYLINDRICAL LAYERS

Chun T. Wang, Salem, and Robert H. Scanlon, Albany, both of Oreg., assignors to Teledyne Industries, Inc., Albany, Oreg.

Filed Apr. 10, 1989, Ser. No. 335,368

Int. Cl.[5] B23K *20/24*

U.S. Cl. 228—131 **1 Claim**

1. A diffusion bonding process for fabricating unitary seamless tubular articles, which articles comprise at least two concentric metallic layers formed by fitting the surfaces of at least two concentric cylindrical parts together to form an extrusion billet assembly, comprising the following steps in order:

(1) treating the billet assembly consisting of either zirconium or zirconium alloy by hot isostatic pressing at a range of from about 15,000 to about 45,000 psi and temperature of from about 450° C. to about 1250° C. for sufficient time to form a bond between metallic layers, and

(2) heating said billet at a temperature of from about 450° C. to about 1250° C. for a time sufficient to promote diffusion across the bondline of the metallic layers whereby the bonding strength is increased and the occurrence of bondline defects in the finished tubular articles is reduced, and

(3) quenching the heated billet by immersion in a quenchant maintained at a temperature in the range of from about 0° C. to about 100° C.

4,995,549

METHOD AND APPARATUS FOR FORMING AND WELDING THIN-WALL TUBING

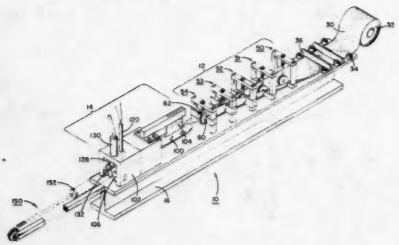
Robert R. Hellman, Sr., 35 Hawley Rd., Oxford, Conn. 06483

Continuation-in-part of Ser. No. 278,819, Dec. 1, 1988, Pat. No. 4,905,885. This application Mar. 5, 1990, Ser. No. 488,257

The portion of the term of this patent subsequent to Mar. 6, 2007, has been disclaimed.

Int. Cl.[5] B23K *5/06, 9/025*

U.S. Cl. 228—147 **17 Claims**



1. An apparatus for welding the longitudinal seam of a tube formed from a flat sheet, comprising:

(a) first support means dimensioned to engage substantially the entire inner periphery of said tube;

(b) second support means, concentric with said first support means, dimensioned to engage substantially the entire outer periphery of said tube, thereby to movably hold said tube in the annulus formed between said first and second support means, at least at the point of welding of said tube;

(c) an opening defined in said second support means adjacent said seam into which opening the edges of said seam protrude in closely spaced apart relationship;

(d) welding means in fixed position relative to said second support means and in welding contact with said seam and adapted for relative movement with said seam, thereby to fill the interstice between the edges of said seam to join said edges; and

(e) water cooled first heat sink means fixedly disposed in said first support means adjacent said seam, and in continuous contact therewith, so as to remove heat from the area of said tube surrounding said seam as said seam is welded.

4,995,550

VALVE METAL/PLATINUM COMPOSITE ELECTRODE

Herbert Appl, Krailing; Michael Gnann, Pfaffenhofen; Wolfgang Jahr, Wolfratshausen, and Erwin Rossberger, Grossdingharting, all of Fed. Rep. of Germany, assignors to Peroxid-Chemie GmbH, Hoellriegelskreuth, Fed. Rep. of Germany

Filed Jul. 13, 1989, Ser. No. 380,155

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1988, 3823760

Int. Cl.[5] H01M *4/58;* **B23K** *20/22, 101/36*

U.S. Cl. 228—175 **27 Claims**

1. A process for the production of a planiform composite electrode comprising a valve metal layer with a platinum layer securely adhering thereto by hot isostatic pressing of said valve metal layer and said platinum layer between separating sheets, wherein the separating sheet which comes in contact with the platinum layer during the hot isostatic pressing consists of a metal having a melting point of at least 100° C. above the hot isostatic pressing temperature.

4,995,551

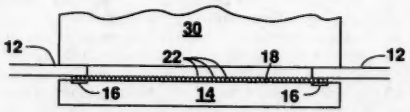
BONDING ELECTRICAL LEADS TO PADS ON ELECTRICAL COMPONENTS

Colin A. MacKay, Austin, Tex., assignor to Microelectronics and Computer Technology Corporation, Austin, Tex.

Filed Apr. 24, 1990, Ser. No. 513,504

Int. Cl.[5] H05K *3/32*

U.S. Cl. 228—177 **32 Claims**



1. A method of bonding a first plurality of electrical leads to a second plurality of electrical pads comprising,

covering each pad with a plurality of electrically conductive particles, wherein the pads are in and aligned with an essentially smooth top surface of an electrical component;

aligning the electrical leads with the particles and pads, wherein portions of the electrical leads extend beyond the outer periphery of the top surface of the electrical component; and

simultaneously bonding the particles to the pads and the aligned electrical leads to the particles.

4,995,552

ANTI-OXIDATION SYSTEM OF A WIRE BONDER USING A COPPER WIRE

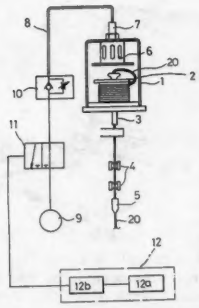
Wan-Kyoon Choi, and Jong-Whan Kim, both of Buchun, Rep. of Korea, assignors to SamSung Electronics Co. Ltd., Suweon, Rep. of Korea

Filed May 23, 1989, Ser. No. 356,547

Claims priority, application Rep. of Korea, Jun. 2, 1988, 1988-6623; Jun. 30, 1988, 1988-8038

Int. Cl.[5] H01L *21/60*

U.S. Cl. 228—179 15 Claims



1. An anti-oxidation system of a wire bonder for bonding a wire between a chip pad and a lead frame for a semiconductor device, said wire being an oxidizable material selected from the group including copper or aluminum, comprising:

means for creating an atmosphere of a reduction gas for preventing oxidation of the wire by periodically supplying said reduction gas around a spool wound with said wire,

at least one gas tube for supplying the reduction gas disposed towards at least one of opposite sides of a capillary device drawing out the wire, said gas tube being disposed, just beneath the end of the capillary device, transversely to a direction of passage of the wire through the capillary device, and

a torch disposed facing a lower surface of either said one gas tube and another gas tube, just beneath the capillary device.

4,995,553

THERMALLY CONTROLLED VALVE

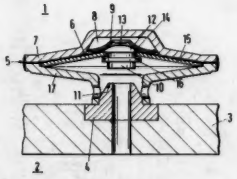
Werner Foller, Stuhr, and Holm Klann, Bremen, both of Fed. Rep. of Germany, assignors to GESTRA Aktiengesellschaft, Bremen, Fed. Rep. of Germany

Filed Sep. 7, 1989, Ser. No. 404,276

Claims priority, application Fed. Rep. of Germany, Sep. 16, 1988, 3831487

Int. Cl.[5] G05D *23/10*; F16T *1/10*

U.S. Cl. 236—48 R 2 Claims



1. A thermally controlled valve, in particular, a condensate drain valve, comprising

a valve seat, a first closure valve associated with said valve seat, an expansion capsule containing an evaporation medium which actuates the closure valve by means of a stroke-displaceable wall part, a spring biasing said closure valve in the opening direction,

said spring being a monostable snap spring, and said monostable snap spring is arranged in such a way that in the closed position of the valve, it occupies a position of stroke lying distant to the force minimum of its force-stroke-characteristic;

said expansion capsule is arranged upstream of said valve seat;

an intermediate chamber is arranged downstream of said valve seat having a second valve seat at a discharge therefrom;

a second closure valve is provided in said intermediate chamber which interacts with said second valve seat; and

coupling means coupling said first and second closure valves so that said second closure valve is, to a limited degree, relatively stroke-displaceable with respect to said first closure valve.

4,995,554

CONTROL UNIT FOR A HEATING, VENTILATING AND/OR AIR CONDITIONING INSTALLATION FOR AN AUTOMOTIVE VEHICLE

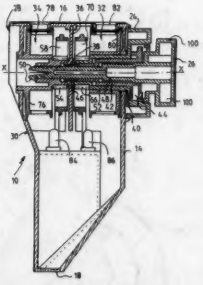
Michel Auvity, Velizy, and Patrice Chesnier, Asnieres, both of France, assignors to Valeo, Paris, France

Filed May 15, 1989, Ser. No. 352,028

Claims priority, application France, May 17, 1988, 88 06593

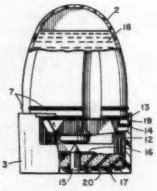
Int. Cl.[5] G05D *23/00*

U.S. Cl. 236—51 8 Claims



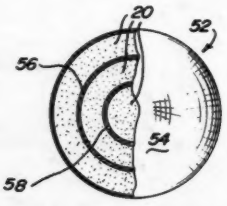
1. A control unit for an installation for heating, ventilating and/or air conditioning of an automotive vehicle, wherein the control unit comprises: a module in the form of a housing; two control knobs; means mounting the two control knobs to the housing, coaxially with each other with the control knobs projecting rotatably from the outside of the housing, the said mounting means comprising two coaxial shafts, namely an inner shaft and an outer shaft, each connected with a respective one of the two said control knobs for rotation therewith; two transmission members, the said inner shaft having means rotatably coupling it with one said transmission member and the outer shaft having means rotatably coupling it with the other transmission member; and means mounting the transmission members within the housing, the said transmission members being arranged to act respectively on temperature regulating means and on air distribution means for air to be passed into the interior of the vehicle, the control unit further comprising a fixed intermediate sleeve disposed between the two said shafts over at least part of the length of the latter so as to prevent any interaction between the said control knobs.

4,995,555
AIR TREATMENT DEVICE AND METHOD
Keith F. Woodruff, Mountainside, N.J., assignor to American Cyanamid Company, Stamford, Conn.
Filed Nov. 14, 1988, Ser. No. 270,575
Int. Cl.[5] A61L 9/04
U.S. Cl. 239—43 21 Claims



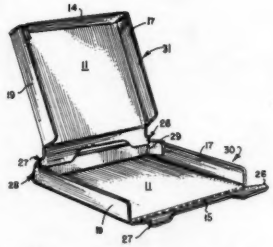
1. An air treating device comprising a liquid reservoir having a mouth opening, a base supporting and surrounding a liquid absorbent material, piercing means extending upwardly from said base and absorbent material, means for attaching said reservoir to said base such that said piercing means is in direct alignment with said mouth opening, and liquid metering control means surrounding said piercing means and between said mouth opening and said absorbent material, whereby said device provides a rate of dispersion which is substantially even over an extended period of time, and wherein said liquid metering control means is an effectively distant ebb height between the bottom of said mouth opening and the top surface of said absorbent material, said effective ebb height being adapted to hydraulically cease flow from said reservoir when said absorbent material is saturated and prevent contact between said absorbent material and said mouth opening.

4,995,556
UNITIZED SODIUM BICARBONATE DEODORIZER
Benjamin L. Arnold, III, 18695 Cambridge Rd., Lathrup Village, Mich. 48076
Filed Jan. 25, 1988, Ser. No. 148,004
Int. Cl.[5] A61L 9/04, 9/12
U.S. Cl. 239—57 3 Claims



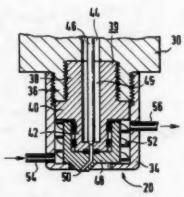
1. An article of manufacture for deodorizing one of selected places comprising:
- a preselected amount of a deodorizing compound having odor reducing characteristics;
- said deodorizing compound being provided in a substantially pulverized form and housed in a container;
- said container having a preselected shape; and
- said compound having surface area exposed to the atmosphere through said container;
- said container comprising a plurality of at least three concentric, ball-shaped shells of a substantially rigid material;
- said concentric shells being provided with a plurality of holes, said holes of one shell being non-aligned with holes of an adjacent shell;
- said concentric shells being provided in spaced-apart relation to one another; and
- said deodorizing compound is provided in the spaces between said shells.

4,995,557
EAT-IN/CARRYOUT PIZZA BOX
Edwin A. Fremion, Chesterfield, Va., assignor to Westvaco Corporation, New York, N.Y.
Filed Apr. 26, 1990, Ser. No. 514,600
Int. Cl.[5] B65D 5/28
U.S. Cl. 229—125.29 3 Claims



1. A combination cover/tray component for use with another identical cover/tray component, said component being formed from a unitary blank of foldable sheet material, comprising:
- (a) a centrally located base panel of generally rectangular shape having a front edge, a rear edge, side edges and front and rear corners at the intersections of said edges, a pair of opposed side walls having inside and outside surfaces and front and rear portions foldably attached to the side edges of the base panel;
- (b) a rear wall having ends foldably attached to the rear edge of the base panel; and,
- (c) a front wall having ends foldably attached to the front edge of the base panel, the improvement wherein the rear wall includes a glue flap foldably attached along a fold line to each end of the rear wall which is adhered to the inside surface of the rear portion of each adjacent side wall, a pair of slots formed at the rear corners of the base panel along the fold lines connecting the glue flaps to the ends of the rear wall, and a pair of tab elements located at the ends of the front wall was extensions thereof.

4,995,558
APPARATUS FOR APPLYING A THERMOPLASTIC HIGH-POLYMER MATERIAL, IN PARTICULAR AN ADHESIVE, TO A SUBSTRATE
Henning J. Claassen, Lüneburg, Fed. Rep. of Germany, assignor to Nordson Corporation, Westlake, Ohio
Filed Feb. 16, 1989, Ser. No. 311,309
Claims priority, application European Pat. Off., Mar. 23, 1988, 88104676.7
Int. Cl.[5] B05B 7/04
U.S. Cl. 239—226 5 Claims



1. Apparatus for applying a liquified thermoplastic high-polymer material to a substrate comprising: an application

head, at least one feed passage for the liquified material in the application head, a valve arrangement for opening and closing the feed passage, a rotation element rotatably mounted to said application head, a liquified material passage extending through said rotation element, said liquified material passage having one end in communication with the feed passage and another end providing a nozzle-like outlet opening, a fluid power connection for connecting a source of fluid power to said application head, and fluid drive means carried by said rotation element and responsive to said fluid power for rotating said rotation element independently of the supply of liquified material to said application head.

4,995,559

ELECTROMAGNETIC FUEL INJECTION VALVE

Yoshio Okamoto; Yozo Nakamura, both of Ibaraki; Kyoichi Uchiyama, Kashiwa; Haruo Watanabe; Tokuo Kosuge, both of Ibaraki; Akira Onishi, Tsuchiura; Akashi Terasaki; Hiroyuki Ando, both of Katsuta, and Eiji Hamashima, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Automotive Engineering Co., Ltd., Katsuda, both of, Japan

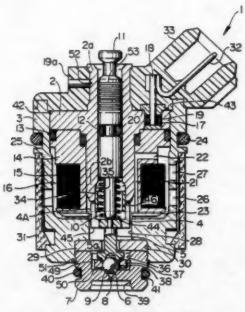
Continuation of Ser. No. 211,261, Jun. 24, 1988, Pat. No. 4,887,769. This application Jun. 14, 1989, Ser. No. 366,171

Claims priority, application Japan, Jun. 26, 1987, 62-157527; Sep. 25, 1987, 62-238752; Jan. 13, 1988, 63-3737

The portion of the term of this patent subsequent to Dec. 19, 2006, has been disclaimed.

Int. Cl.[5] B05B *1/30, 1/34*

U.S. Cl. 239—493 **10 Claims**



1. An electromagnetic fuel injection valve comprising:

a valve housing having a fuel passage therein along which a valve seat is formed;

a fuel swirling element supported within said fuel passage of said valve housing upstream of said value seat and having swirl passages therein for imparting a swirling motion to fuel;

a fuel injection port formed in said valve housing downstream of said valve seat;

a ball valve movable toward and away from said valve seat in an axial direction of said valve housing for injecting the fuel, swirled by said fuel swirling element, from said fuel injection port; and

means for setting the stroke amount of said ball valve so as to produce a constant static flow rate of the fuel.

4,995,560

PAINT HOSE EXTENSION FOR ELECTROSTATIC SPRAY GUN

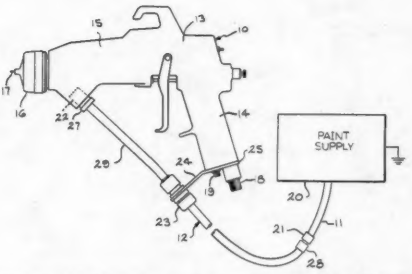
Charles T. Lasley, Toledo, and James J. Gimple, Oregon, both of Ohio, assignors to Illinois Tool Works, Inc., Glenview, Ill.

Filed Jul. 18, 1989, Ser. No. 381,573

Int. Cl.[5] B05B *5/02*

U.S. Cl. 239—708 **7 Claims**

1. A paint hose extension for insertion between a free end of a paint supply hose and an electrostatic paint spray gun having an electrically grounded handle, a barrel and nozzle assembly for receiving and atomizing paint and a high voltage electrode for imparting an electrostatic charge to the paint, said paint supply hose having a remote end connected to an electrically grounded paint section, said hose extension comprising electrically non-conductive hose means extending between said barrel and nozzle assembly and said paint supply hose for providing a predetermined long electrically insulated paint flow path



between said paint supply hose and said barrel and nozzle assembly, means supporting said hose means at said spray gun from said handle, an electrically conductive layer surrounding said hose means between said support means and said paint supply hose, means electrically connecting said conductive layer to said spray gun handle, and means electrically connecting said conductive layer to paint at said free end of said paint supply hose whereby paint in said supply hose is electrically grounded at both ends of aid supply hose.

4,995,561

GROUND SAND MAKER

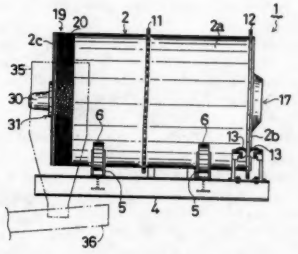
Oogawara Yukimi, Tottori, Japan, assignor to Nakaya Jitsugyo Co., Ltd., Tottori, Japan

Filed Oct. 10, 1989, Ser. No. 419,205

Claims priority, application Japan, Feb. 23, 1989, 1-44336

Int. Cl.[5] B02C *17/02*

U.S. Cl. 241—62 **4 Claims**



1. A ground sand maker comprising:

a grinding drum having a circumferential surface, a first end wall with an end edge, and a second end wall opposed to said first end wall;

a mass of working pebbles placed within said grinding drum;

driving means for rotating said grinding drum, said driving means includiing a plurality of rollers on which said grinding drum is placed for rotation and at least one pair of rollers for holding said end edge between them;

an inlet port provided on said first end wall for supplying rock fragments and water into said grinding drum; and

an outlet sieve provided on said circumferential surface

adjacent said second end wall for discharging sand and water.

4,995,562

DEVICE FOR DRAWING A YARN IN A SLIT

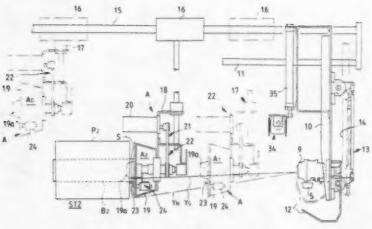
Toshiaki Koga, and Yasunori Hatakeyama, both of Shiga, Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Sep. 1, 1989, Ser. No. 402,222

Claims priority, application Japan, Sep. 2, 1988, 63-115029[U]

Int. Cl.[5] B65H *54/00*

U.S. Cl. 242—35.6 DE **14 Claims**



1. A device for removing yarn from a slit in a bobbin having an axis and a bunch winding of yarn thereon, the device comprising:

release means for releasing the bunch winding of yarn,

yarn drawing means for drawing the yarn from the slit,

a ring body having an axis,

alignment means for aligning the axis of the bobbin and the axis of the ring body,

positioning means for positioning the ring body substantially adjacent the bobbin,

rotation means for rotating the ring body,

a pawl member associated with the ring body for engaging the yarn drawn from the slit, and

a capture device associated with the pawl member for capturing the yarn engaged by the pawl member

---

4,995,563

APPARATUS FOR WINDING UP AND UNWINDING PRINTED PRODUCTS INFED AND OUTFED IN AN IMBRICATED FORMATION BY MEANS OF A CONVEYOR

Urs Kälin, Hinwil, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

Continuation of Ser. No. 215,049, Jul. 5, 1988, abandoned. This application Nov. 17, 1989, Ser. No. 440,409

Claims priority, application Switzerland, Jul. 2, 1987, 2524/87

Int. Cl.[5] B65H *63/08, 61/00*

U.S. Cl. 242—59 **9 Claims**

1. An apparatus for winding, especially selectively winding up into a product package and unwinding from a product package printed products, particularly newspapers, magazines and periodicals, in the form of an imbricated stream of such printed products, comprising:

a winding core for the printed products;

conveyor means having a predeterminate conveyor velocity for transporting the printed products to and from the winding core;

a spool for a winding band and having a diameter depending upon the amount of wound-up winding band located thereon;

said winding band being connected at one end with the winding core;

a rotatable deflection roll operatively associated with said supply spool;

said winding band extending between the spool and the winding core and passing over the rotatable deflection roll;

the winding core being driven or braked and at the same time the spool being braked or driven, respectively;

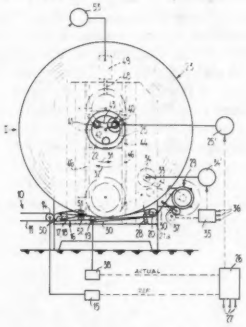
an electrical regulation motor operatively connected with the winding core;

said spool having a core;

a rotary electrical machine operatively connected with the core of the spool;

said winding core being bi-directionally rotatable;

means for tapping off a reference value of the conveyor means, essentially corresponding to the predeterminate conveyor velocity of the conveyor means, in both directions of rotation of the winding core for controlling the rotational speed of the electrical regulation motor;



means for tapping off an actual value of the circumferential speed of the deflection roll in both directions of rotation of the winding core;

means for generating a signal indicative of the momentary diameter of said spool;

control means connected in circuit between said means for generating said signal indicative of the momentary diameter of said spool and said rotary electrical machine for controlling the torque exerted by said rotary electrical machine and operating said rotary electrical machine in one rotational direction with braking slip and in the other rotational direction with drive slip.

4,995,564

REWINDER FOR THIN TAPE

Sandro Zuliani, Bottens, Switzerland, assignor to Bobst SA, Switzerland

Filed Sep. 7, 1989, Ser. No. 403,820

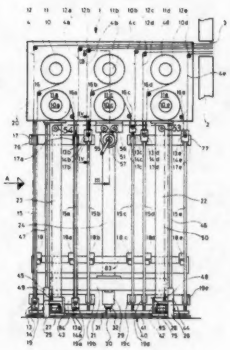
Claims priority, application Switzerland, Sep. 16, 1988, 03474/88

Int. Cl.[5] B65H *18/08, 59/36, 20/24;* **B23Q** *3/14*

U.S. Cl. 242—67.10 R **10 Claims**

5. A rewinder for thin tapes, especially tape-based metallized foils used in machines processing sheet-like material, such as boards and paper, said rewinder device comprising a frame having an upper frame portion connected to a lower chassis, a rewinding appliance unit including a motor assembly with a reduction gear, an axle of said reduction gear carrying a reel carrier hub, said reel carrier hub receiving a terminal wind-up reel, a guide arrangement for said tape including a first and third roller mounted on the upper portion of said frame, means for maintaining a mechanical tension on said tape including a vertically extending slide bar extending between the upper frame and the lower chassis, a dancer movable along said slide bar, a second roller for receiving a loop of said tape being mounted on said dancer to move therewith, an upper switch and a lower switch, said rewinder including means for stopping said rewinder in response to a breakage of the tape including a tape breakage switch positioned along said slide below the lower switch, hoist means including a lifting device for

lifting the dancers of the rewinder from the tape breakage position to a desired raised position, said tape for each unit



being threaded into said unit over the first roller, around said second roller, to said third roller, and into said reel.

4,995,565

CASSETTE REEL

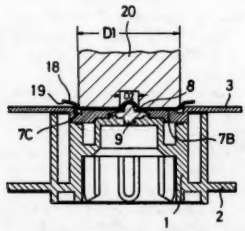
Kiyoshi Urayama, and Kazuo Ozawa, both of Miyagi, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 14, 1987, Ser. No. 108,372

Claims priority, application Japan, Nov. 12, 1986, 61-269402

Int. Cl.[5] B65H *75/18*; G11B *23/087*

U.S. Cl. 242—71.8 **6 Claims**



1. A cassette reel for use in a tape cassette of the type having a housing with at least one window therein so that the tape volume wound by the cassette reels can be seen, comprising:

a cylindrical hub for winding the tape;

an upper, substantially flat flange attached to the hub and made of a transparent plate for aligning an edge of said tape and for allowing said tape volume to be seen;

an annular groove formed in one surface of said upper flange coaxially with the longitudinal axis of said hub; and

a foil, hot stamp deposited on said upper flange which is coextensive with the inner diameter of said groove.

4,995,566

REEL

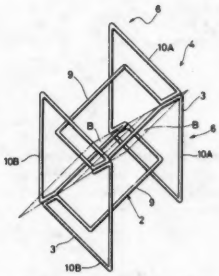
Katsumi Kotegawa, deceased, late of Katano (by Ikuyo Kotegawa, Tetsuya Kotegawa, Takeshi Kotegawa, Toshiki Kotegawa, heirs); Yoshihiro Okuda, Osaka; Masaru Uera, Neyagawa, and Hirofumi Miki, Daito, all of Japan, assignors to Tsubakimoto Chain Co., Japan

Continuation of Ser. No. 297,163, Jan. 13, 1989, abandoned. This application Apr. 11, 1990, Ser. No. 512,089

Claims priority, application Japan, Jan. 13, 1988, 63-6513

Int. Cl.[5] B65H *75/20*

U.S. Cl. 242—77.2 **4 Claims**



1. A reel for a chain or the like comprising a core portion adapted to have a chain wound around it and a pair of flange portions arranged at opposite ends of the core portion for retaining the chain on the core portion, wherein the reel has an axis of rotation, the core and flange portions are constituted by a pair of bent rods bonded together, wherein the number of bent rods in the reel is limited to two, and wherein each bent rod comprises at least two substantially parallel core-forming elements spaced from each other, the two substantially parallel core-forming elements of each bent rod being spaced from and arranged substantially parallel to the two substantially parallel core-forming elements of the other bent rod, the core-forming elements, proceeding circumferentially around said axis, being in sequence, the two core-forming elements of one rod followed by the two core-forming elements of the other rod, and the four core-forming elements being equally spaced from said axis, whereby the core of the reel comprises at least four substantially parallel, spaced core-forming elements, in which each of said bent rods is closed upon itself to form a continuous closed loop and in which each of said bent rods has flange-forming elements at both ends of the core portion, the flange-forming elements at each end of the core portion connecting one end of one of the core-forming elements to one end of the other core-forming element.

4,995,567

SPRING-LOADED BARREL, IN PARTICULAR FOR A SEAT BELT RETRACTOR

Jean-Noël Ballet, Aillevilliers, France, assignor to Ecia-Equipements et Composants pour l'Industrie Automobile, Audincourt, France

Filed Nov. 27, 1989, Ser. No. 441,307

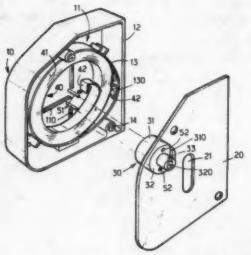
Claims priority, application France, Nov. 30, 1988, 88 15720

Int. Cl.[5] B65H *75/48*; F03G *1/08*

U.S. Cl. 242—107 **15 Claims**

1. Barrel for a pretensioned spiral spring which consists, inter alia, of a casing (**10**) with a base (**11**), of a coverplate (**20**) intended to be placed at a distance from this base (**11**) in order to define with the latter a chamber (**100**), of an orifice (**21**) opening out into this chamber in order to make it accessible, of a hub (**30**) equipped with a coupling member (**320**) and which is intended to be housed in this chamber (**100**) so that its axis (**300**) is virtually orthogonal to this base (**11**) and this coverplate (**20**) and so that this coupling member is perpendicular to this orifice in order to be accessible from the outside, and of a

spiral spring (40) placed in this chamber (100) and coiled around this hub (30) such that one of its ends (42) is anchored on the hub (30) and the other of its ends is anchored on the casing (10), characterized in that is comprises a device (50) for temporarily immobilizing the hub (30) in this chamber (100)



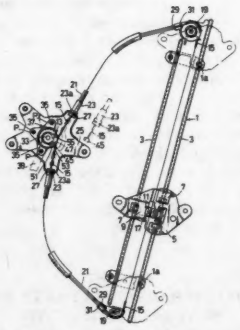
which consists of male (51) and female (52) complementary elements which are intended to be engaged in each other and which are carried by the chamber (100) and the hub (30) where these male elements (51) are fragile and are intended to break as a result of the action exerted upon the hub (30) through the orifice (21) once the spring has been tensioned.

4,995,568

WIRE TERMINAL ATTACHING STRUCTURE OF A DRIVEN ROTARY BODY

Jun Yamagishi; Hiromitsu Nishikawa, and Akihiro Takeda, all of Yokohama, Japan, assignors to Ohi Seisakusho Co., Ltd., Yokohama, Japan

Filed Dec. 16, 1987, Ser. No. 133,610
Claims priority, application Japan, Jan. 16, 1987, 62-003600
Int. Cl.[5] B65H *75/28*
U.S. Cl. 242—125.1 **19 Claims**



1. A device for controlling a wire of a wire-operated apparatus, comprising:

a cylindrically-shaped rotary body for controlling the motion of the wire, the rotary body having a first and second end;

a base plate for rotatably supporting the first end of the rotary body;

engaging means formed in the rotary body and engageable with a terminal of the wire, the engaging means having a guide groove communicating with a circumferential groove formed in the rotary body for receiving the wire, and an insertion port communicating with the guide groove for receiving the terminal of the wire; and

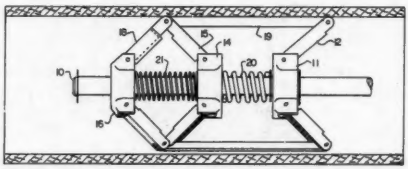
a cover for covering the rotary body and rotatably supporting the second end of the rotary body, the cover being assembled to the base plate and having cut-out portion which exposes the guide groove and the insertion port to allow the wire and the terminal to be inserted through the guide groove for attachment to the rotary body after the cover has been assembled to the base plate.

4,995,569

PACKAGE ADAPTER

James L. Alexander, 1024 N. Tryon St., Charlotte, N.C. 28206

Filed Jan. 16, 1990, Ser. No. 465,441
Claims priority, application Austria, Jan. 20, 1989, PJ2351
Int. Cl.[5] B65H *49/06, 49/20*
U.S. Cl. 242—130 **12 Claims**



1. An apparatus for receiving and engaging a package of strand material would upon a hollow core member having an inner wall and base end and a free end and comprising:

(a) an elongate central shaft means having a base end and free end remote therefrom;

(b) an engaging means mounted on said central shaft means for selective movement between a first, relaxed position and a second, engaging and gripping position in which the inner wall of said hollow core member is engaged and gripped responsive to longitudinal movement of said hollow core member along said central shaft means toward said base end; said engaging means being returned to said first position in which said engaging means is preset for receipt of a new hollow core member when a spent hollow core member is moved in a direction toward said free end;

(c) said engaging means comprising a plurality of connecting link members having base ends and free ends circumferentially spaced about said central shaft means, finger members pivotally connected to said base end, and activating means positioned between and so connecting said finger members together in a linkage set with said central shaft means that said connecting link members are positioned;

(i) in a first relaxed position in which the connecting link members are held along an acute angle path relative to the central shaft means which angle expands radially toward the base end of said central shaft means and at least a portion f said connecting link members are in the path of the hollow core member as it is mounted on said apparatus; and

(ii) in said second, engaging and gripping position in which said base ends of said connecting link members are urged radially inwardly toward said central shaft means, the free ends of said connecting link members are urged radially outwardly toward the inner wall of the hollow core member, and the hollow core member is grippingly engaged along a line extending longitudinally along the inner wall thereof.

4,995,570

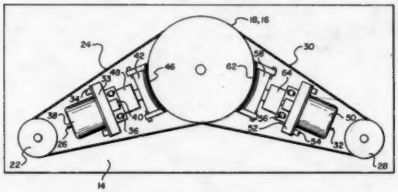
REEL BRAKE ASSEMBLY ACTUATED BY LINEAR STEPPER MOTOR

Henry M. Martija, La Verne, Calif., assignor to Datatape Incorporated, Pasadena, Calif.

Filed Mar. 1, 1989, Ser. No. 317,381
Int. Cl.[5] G11B *15/22;* **B65H** *26/04*
U.S. Cl. 242—193 **6 Claims**

6. In magnetic recording/reproducing apparatus, the invention comprising:

a hub for supporting magnetic media;
a rotatably mounted shaft upon which said hub is mounted;
a drive pulley mounted on said shaft;
a rotatably mounted motor pulley spaced from said drive pulley;
a belt which is trained about said drive pulley and said motor pulley and which forms spans between said pulleys; and
a brake assembly located between the spans of said belt; said



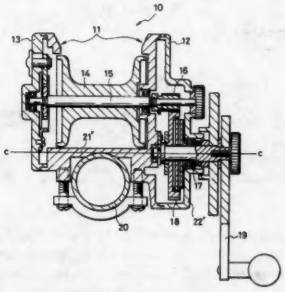
brake assembly including a linear stepper motor having a linearly actuated shaft extending radially of said drive pulley and a brake pad mounted on the end of said shaft adjacent to said drive pulley; wherein actuation of said linear stepper motor causes linear movement of said motor shaft to effect direct radial braking engagement between said brake pad and said drive pulley, said brake pad engaging said drive pulley in the same circumferential region normally contacted by said belt.

4,995,571

LOW TORQUE EFFECT FISHING REEL

Michiki Kawai, Tokyo, Japan, assignor to Daiwa Seiko, Inc., Tokyo, Japan

Continuation of Ser. No. 182,506, Apr. 18, 1988, abandoned. This application Aug. 11, 1989, Ser. No. 394,318
Claims priority, application Japan, Apr. 17, 1987, 62-58330[U]
Int. Cl.[5] A01K *89/015*
U.S. Cl. 242—249 **3 Claims**



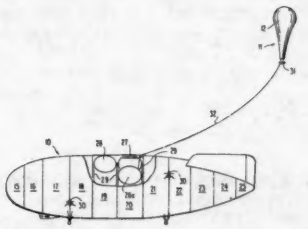
1. A fishing reel comprising:
a fishing rod having a reel mounting surface and a longitudinal axis;
spool means for winding fishing line, said spool means having a longitudinal axis;
handle shaft means operatively coupled to said spool means for rotating said spool means to take up fishing line thereon, said handle shaft means having a central, longitudinal axis;
transmission means for operatively connecting said handle shaft means to said spool means;
frame means for rotatably supporting said spool means and said handle shaft means and for housing said transmission means, said frame means including a rod mounting base portion formed integrally therewith at a lower portion thereof and having a mounting surface for engaging said mounting surface of said fishing rod, said handle shaft means being mounted to said frame means so that the central, longitudinal axis thereof penetrates said mounting surface of said base portion so as to define a means for substantially reducing rotational torque acting on the fishing rod when said handle shaft is rotated relative to said frame means, wherein,
an imaginary perpendicular line extended through said longitudinal axis of said spool means and said central, longitudinal axis of said handle shaft means intersects said longitudinal axis of said fishing rod at substantially a right angle thereto.

4,995,572

HIGH ALTITUDE MULTI-STAGE DATA ACQUISITION SYSTEM AND METHOD OF LAUNCHING STRATOSPHERIC ALTITUDE AIR-BUOYANT VEHICLES

Frank N. Piasecki, Haverford, Pa., assignor to Piasecki Aircraft Corporation, Essington, Pa.

Filed Jun. 5, 1989, Ser. No. 361,274
Int. Cl.[5] B64C *37/02*
U.S. Cl. 244—2 **35 Claims**



1. A two stage stratosphere altitude data acquisition system comprising a first and a second air-buoyant vehicle, said first vehicle comprising lighter-than-air gas containing means, data acquisition means, flight associated items and means supportingly affixing said data acquisition means and associated items to said gas containing means, said gas containing means being expandable to a volume as will displace an amount of air at a stratosphere float altitude equal to the weight of said first vehicle and containing an amount of lighter-than-air gas as will displace said volume of air at said stratosphere float altitude equal to the weight of said first vehicle, said second vehicle comprising a lighter-than-air aircraft having control and propulsive means for controlled flight operations of said aircraft at troposphere altitudes, releasable retaining means for retention of said first vehicle by said aircraft, said retaining means being operable from a vehicle retaining position to a position releasing said first vehicle from retention by and free of said aircraft at a selected troposphere launching altitude, said aircraft propulsive means including means creating vectored thrust forces of directions and amounts as establishes said aircraft in a level flight condition of substantially zero air speed, whereby said first vehicle can be launched from said aircraft into the troposphere under an essentially no wind condition for ascension to said stratosphere float altitude upon establishing said retaining means in said releasing position.

4,995,573

PROJECTILE EQUIPPED WITH GUIDE FINS

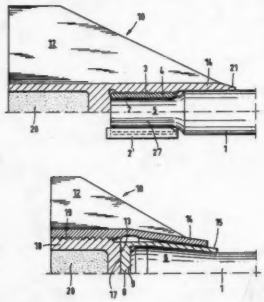
Peter Wallow, Langenfeld, Fed. Rep. of Germany, assignor to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany

Filed Dec. 22, 1989, Ser. No. 453,288

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1988, 3843796

Int. Cl.[5] F42B *10/08*

U.S. Cl. 244—3.24 **14 Claims**



1. A projectile, comprising:

a main body having a smooth end region;

an intermediate sleeve positioned over said smooth end region, said intermediate sleeve having an internal surface and an external thread, said intermediate sleeve being soldered at said internal surface to said smooth end region;

a guide mechanism sleeve at a tail region of the projectile, having an internal thread screwed with said internal thread onto said external thread of said intermediate sleeve; and

guide fins fixed to said guide mechanism sleeve.

4,995,574

DEVICE FOR INCREASING THE STABILITY OF HELICOPTERS PLACED ON BOARD AND SET DOWN, HAVING A TRICYCLE LANDING GEAR, AND HELICOPTER EQUIPPED WITH SUCH A DEVICE

Louis A. Bernard, Saint Victoret, and René Thomassin, Velaux, both of France, assignors to Aerospatiale Societe Nationale Industrielle, Paris, France

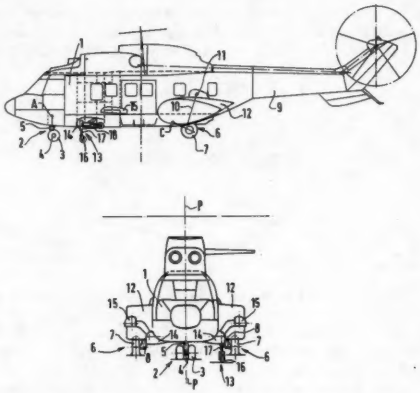
Filed Jan. 17, 1989, Ser. No. 297,521

Claims priority, application France, Jan. 15, 1988, 88 00443

Int. Cl.[5] B64C *25/04*

U.S. Cl. 244—17.17 **15 Claims**

1. A device for increasing the stability of a helicopter having a tricycle landing gear (**2**, **6**) constituted by two main and lateral undercarriages (**6**) and one auxiliary undercarriage (**2**) when said helicopter is set down on a moving platform, said device comprising an auxiliary stabilizing gear operative only when said helicopter is landing with a rotor thereof rotating or stopped, said stabilizing gear comprising at least two lateral stabilizers (**13**), each of said lateral stabilizers comprising a rigid support (**17**, **27**) having an end part which supports at least one stabilizing wheel (**16**) for contact with said platform, said rigid support (**17**, **27**), at least in position of use, being integral with a stable structure of said helicopter at a lower part of a fuselage (**1**) of said helicopter, said rigid supports being offset laterally one on each side of a vertical and median longitudinal plane (PP) of said helicopter, in the direction turned towards an auxiliary undercarriage (**2**) in relation to said main and lateral undercarriages (**6**) of said tricycle landing gear, in such a manner that said at least one stabilizing wheel (**16**) is supported on said moving platform, on both sides of said longitudinal and median plane of said helicopter (PP) when



said helicopter rests on said platform with said tricycle landing gear (**2**, **6**).

4,995,575

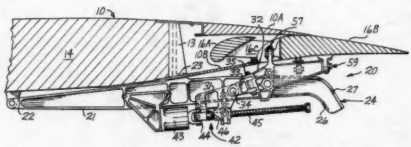
WING TRAILING EDGE FLAP MECHANISM

Martin F. Stephenson, Issaquah, Wash., assignor to The Boeing Company, Seattle, Wash.

Continuation-in-part of Ser. No. 251,042, Sep. 26, 1988, abandoned, which is a continuation of Ser. No. 121,365, Nov. 16, 1987, abandoned. This application Jun. 14, 1989, Ser. No. 365,994

Int. Cl.[5] B64C *9/16*

U.S. Cl. 244—216 **23 Claims**



1. Track and carriage means for the support and movement of dual auxiliary airfoils on a main airfoil, comprising:

(a) an elongated beam mounted to said main airfoil and extending generally chordwise thereof;

(b) said track means comprising a first and a second guide track affixed to said elongated beam;

(c) said carriage means comprising a first carriage and a second carriage, said first and said second carriage being pivotably interconnected;

(d) a first and a second pair of rollers mounted on said first carriage for constant engagement with said first guide track;

(e) a third pair of rollers mounted on said second carriage for constant engagement with said second guide track;

(f) said second carriage being affixed to said dual auxiliary airfoils, and

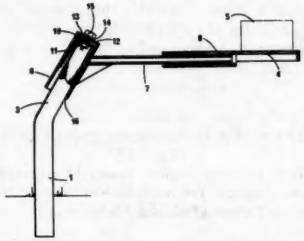
(g) means for actuating said first and second carriages so as to move said dual auxiliary airfoils to an extended position relative to the main airfoil.

4,995,576

MOUNTING FOR ROADSIDE MAILBOX

Carl A. Kieswetter, R.R. 1, St Agatha, Ontario, Canada (N0B 2L0)

Filed Feb. 17, 1987, Ser. No. 15,690
Claims priority, application Canada, Mar. 7, 1986, 503576
Int. Cl.[5] B65D *91/00*
U.S. Cl. 248—145 5 Claims



1. Mounting for a roadside mailbox, wherein:
the mounting includes a mailbox-receiving arm, and a groundpost;
the mounting includes a journal bearing means and a thrust bearing means, for pivoting the arm about a pivot axis relative to the groundpost;
the bearing means are so arranged that the said pivot axis between the arm and the ground post is inclined at a substantial angle to the vertical;
the journal bearing means includes a journal bearing rotor and a journal bearing stator;
the journal bearing stator comprises an upper portion of the said groundpost;
the journal bearing rotor comprises a tube, the tube being unitary with the arm;
the tube has an upper end and a lower end, and includes a cap, which closes off the said upper end of the tube;
the arrangement of the mounting is such that the cap of the tube lies in operative engagement against the top of the groundpost;
the thrust bearing means includes a thrust bearing rotor and a thrust bearing stator;
the thrust bearing means is so disposed and arranged that the weight of the arm is transmitted to the groundpost by direct rubbing contact between the thrust bearing rotor and the thrust bearing stato during pivoting of the arm;
the thrust bearing stator comprises the top of the groundpost;
the thrust bearing rotor comprises the cap;
the lower end of the tube extends a substantial distance down the groundpost from the said thrust bearing means;
the lower end of the tube is in direct rubbing engagement with the groundpost during pivoting of the arm;
and the diameter of the tube is so dimensioned, in relation to the diameter of the post, as to provide a substantial diametral clearance between the lower end of the tube and the post.

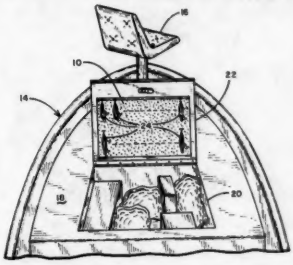
4,995,577

FISHING PLUG ORGANIZER

Barry L. Wood, 140 Hol-Mar Trail, McDonough, Ga. 30253

Filed Aug. 11, 1989, Ser. No. 392,585
Int. Cl.[5] A47B *96/00*
U.S. Cl. 248—205.3 5 Claims

1. An organizer for retaining a plurality of barbed hook-carrying devices, such as fishing lures, in a desired, predetermined orientation relative to one another to prevent tangling thereof, comprising a piece of relatively tough strong, tear-resistant elastomeric material exhibiting a coarse surface texture characterized by a random pattern of surface voids of varying size, the piece being further capable of having one or more barbed hooks of a lure pierce the material to retain the device in the desired position on the piece and be withdrawn from it to



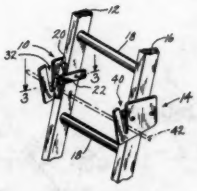
remove the device on a frequency basis without substantially altering the surface appearance of the material of the piece.

4,995,578

APPARATUS AND METHOD FOR SECURING A TUBULAR WORKPIECE IN POSITION ON A SUPPORT

Donald P. Monheim, N22 W28843 Oak La., Pewaukee, Wis. 53072

Filed Apr. 26, 1990, Ser. No. 514,717
Int. Cl.[5] E06C *7/14*
U.S. Cl. 248—210 10 Claims



1. A device for maintaining a workpiece in position on a support, comprising:
a body;
clamping means for affixing said body to said support; and
stationary retainer means provided on said body for engaging said workpiece and fixing the position of said workpiece relative to said support, said retainer means comprising an upwardly facing slot formed in said body and adapted to receive said workpiece therein, said slot being provided with a decreasing transverse dimension toward the lower portion of said body so that downward movement of said workpiece in said slot causes engagement of said workpiece with the walls of said slot.

4,995,579

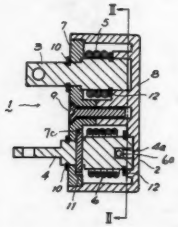
ANGLE ADJUSTMENT DEVICE IN DISPLAY DEVICE

Yoshiharu Kitamura, Komagane, Japan, assignor to NHK Spring Co. Ltd., Yokohama, Japan

Filed Jun. 1, 1989, Ser. No. 359,884
Claims priority, application Japan, Jun. 11, 1987, 62-90215
Int. Cl.[5] H04N *5/64*
U.S. Cl. 248—284 5 Claims

1. An electronic display device comprising a main body, a display unit and an angle adjustment device connected between the main body and the display unit for lifting the display unit from the main body into a viewable position and enabling adjustment of the viewable position, the adjustment device comprising a pivot arm and secured to the main body, a second shaft journalled in the pivot arm in parallel with the first arm and secured to the display unit, a torsion spring connected

between the pivot arm and the second shaft for urging the second shaft to rotate in a direction raising the display unit from the main body, a stop mechanism in the pivot arm for limiting the amount of rotation of the second shaft in said



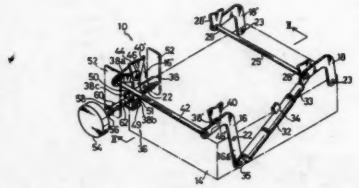
direction, and a lock spring in the pivot arm in frictional engagement with the first shaft allowing rotational adjustment of the pivot arm about the first shaft to provide said adjustment of the viewable position only when the frictional force of the lock spring is overcome.

4,995,580

HEIGHT ADJUSTING DEVICE FOR VEHICLE SEAT

Harutoshi Fujii, Akishima, Japan, assignor to Tachi-S. Co., Ltd., Tokyo, Japan

Filed Jul. 31, 1989, Ser. No. 386,917
Int. Cl.[5] F16M *13/00*
U.S. Cl. 248—421 **5 Claims**



1. A height adjusting mechanism for a vehicle seat, comprising:

a seat frame;

a seat base disposed under said seat frame;

a pair of forward links and a pair of rearward links which are movably provided between said seat frame and seat base;

a seat height adjusting means provided between said forward and rearward links, said seat height adjusting means being adapted to cause vertical movement of said forward and rearward links in an adjustable manner, thereby adjusting vertical position of said seat frame; and

a seat surface inclination adjusting means adapted to adjust the inclination of seat surface of said seat, wherein a tilt link is included therein and, with said tilt link, one of said forward and rearward links is raised or lowered, thereby causing adjustable vertical movement of a forward portion of said seat;

said seat height adjusting means being provided independently of said seat surface inclination adjusting means;

wherein said seat surface inclination adjusting means comprises a pair of tilt links provided between said seat frame and one of said forward and rearward links, an adjustor nut mounted movably in one of said pair of tilt links, and a drive spindle having a threaded portion formed circumstantially thereof which is threadedly engaged with said adjustor nut, said drive spindle being rotatably attached to said seat frame in a manner being prevented against movement in its longitudinal axial direction and being further at its forward end provided with an operation handle; and

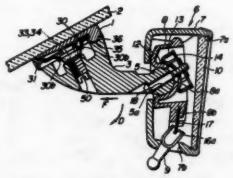
wherein said seat frame is provided with a pair of forward brackets at its forward portion and a pair of rearward brackets at its rearward portion, wherein said pair of forward brackets are each formed with a horizontally elongated hole, wherein a connecting rod extends between said pair of forward links and between said pair of tilt links, wherein one end respectively of said two tilt links is fixed on said connecting rod, while a central portion respectively of said two tilt links, which is provided with a pin, is movably connected with each of said two forward brackets such that said pins of said tilt links are respectively inserted movably through said horizontally elongated holes, and wherein said pair of forward links are at their respective one end connected rotatably to said connecting rod.

4,995,581

INSIDE REARVIEW MIRROR ASSEMBLY FOR MOTOR VEHICLE

Hideo Koiwai, Saitama; Junichi Yamazaki, Chiba; Kunio Yoshino, and Masaharu Tsuruoka, both of Saitama, all of Japan, assignors to Kabushiki Kaisha Matsuyama Seisakusho, Tokyo, Japan

Filed Dec. 2, 1988, Ser. No. 278,800
Claims priority, application Japan, Dec. 4, 1987, 62-185240; Jun. 7, 1988, 63-75483; Jun. 7, 1988, 63-75484
Int. Cl.[5] A47G *1/24*
U.S. Cl. 248—480 **10 Claims**



1. An inside rearview mirror assembly for use in the passenger compartment of a motor vehicle, comprising:

a base adapted to be mounted in the passenger compartment and attached to a body of the motor vehicle;

a mirror;

a stay supporting said mirror;

holder means holding said stay detachably with respect to said base; and

said base and said stay having respective joint surfaces intimately contacting each other, partly spherical interfitting projection and dimple formed respectively on front ends of said joint surfaces with respect to a longitudinal direction of the motor vehicle, and non-contact surfaces disposed forwardly of said projection and dimple with respect to said longitudinal direction and providing a gap between said stay and said base.

4,995,582

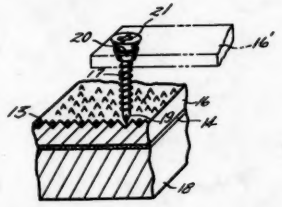
ANTI-SKID REINFORCING PLATE

James T. Ligon, Jr., Almont, Mich., assignor to Ligon Brothers Mfg. Co., Almont, Mich.

Filed Dec. 18, 1989, Ser. No. 451,863
Int. Cl.[5] F16B *5/00*
U.S. Cl. 248—544 **3 Claims**

1. A reinforcing structure useable in removably securing a fixture to a thin wall sheet surface and comprising; a metal reinforcing plate contoured to match the contour of said thin-walled sheet surface and said reinforcing plate having an outermost surface upset by randomly scattered depressions formed therein selectively locating a penetrating tool; and a resilient adhesive underpad of pressure sensitive adhesive material and a release sheet removable cover to actuate said pressure sensitive adhesive for skid proof engagement with a selected thin

wall surface; and one or more self-tapping screws for penetrating said reinforcing plate at selected of said upsets and said thin



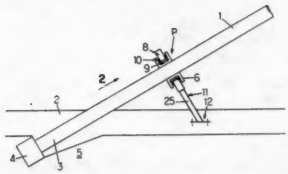
wall surface under a retarding tension-compression load of the threads by said screws and securing said reinforcement structure against release.

4,995,583

DEVICES FOR DAMPING THE VIBRATIONS OF STAY CABLES

Carlos De La Fuente, Nanterre, France, assignor to Freyssinet International (STUP), Boulogne, France

Filed May 15, 1989, Ser. No. 351,226
Claims priority, application France, May 16, 1988, 88 06537
Int. Cl.[5] F16L *3/00*
U.S. Cl. 248—636 **5 Claims**



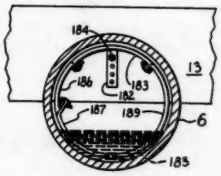
1. Device for damping the vibrations of a stay cable (1) anchored at at least one of its ends in a foundation (5), comprising a first rigid annular member (6) surrounding a section of the cable disposed in the vicinity of said foundation and fast with said section, a second annular member (8) mounted on the first annular member with formation therebetween of an annular cavity (7) so as to be able to move transversely with respect to the first annular member, seals (17) which are practically indeformable interposed between the two annular members so as to seal the annular cavity with respect to the outside, a cushion (9) made from a flowable material, but of constant overall volume, filling the annular cavity, a foundation (12), a rigid structure (11) connecting the second annular member to the foundation (12), the first annular member (6) being comprised of a gutter having in axial half section a radially outwardly open U shape with transverse wings having inner faces, the second annular member (8) being comprised of an annulus having transverse faces housed in the opening of the gutter, grooves (15) formed in the transverse faces of the annulus of the second annular member (8), said seals (17) being interposed between the gutter and the annulus of the second annular member (8), the seals being comprised of annular shoes (17) housed in said grooves (15) formed in the transverse faces of the annulus (8), the shoes being applied axially against the inner faces of the facing transverse wings of the gutter (6), which said inner faces are flat and preferably polished.

4,995,584

CAST-IN-PLACE MANHOLE LINER APPARATUS

Carroll O. Trimble, Springdale, Ark., assignor to Action Products Marketing Corporation, Johnston, Iowa

Continuation of Ser. No. 240,073, Sep. 2, 1988, abandoned, and a continuation of Ser. No. 415,862, Oct. 2, 1989. This application Nov. 30, 1989, Ser. No. 444,033
Int. Cl.[5] E02D *29/12*; E04G *11/20*
U.S. Cl. 249—10 **8 Claims**



1. A form system for casting cylindrical concrete walls with a substantially vertical axis for sewer manholes comprising

a plurality of groups of at least three arcuate panels, the panels of each group having flanges on the horizontal edges thereof,

means for interconnecting said panels of each group to form a smooth solid surface of revolution extending through 360° having a maximum dimension parallel to said vertical axis of less than four feet and for interconnecting said panels of one of said groups and another of said groups along their respective horizontal edges to form an extended solid surface having a dimension substantially parallel to said vertical axis of greater than four feet, each of said groups having at least one panel formed in two separable parts with a vertical dividing line, and

an insert form for creating an opening in the shape of a cylinder at a sewer pipe connection in one of said walls including

at least two arcuate members,

means for interconnecting said members to form a smooth solid open-ended surface in the shape of a cylinder, at least one of said members being formed in two separable parts with a dividing line parallel to the axis of said cylinder,

one of said parts having a planar edge surface along said dividing line forming an angle of at least 3° with the part's opposite edge surface, said angle diverging in the direction of the center of said solid surface in the shape of a cylinder, at least one of said members, when interconnected, terminating at the intersection of a cylindrical surface of radius greater than said cylinder and with an axis at right angles to the axis of said cylinder, and

means for securing said insert form to the outer surface of one of said panels with an open end of said insert form extending below a lower edge of said one of said panels, whereby a channel is provided for fluid flow through said form and concrete wall during the casting process.

4,995,585

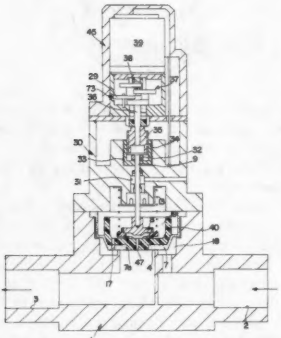
SANITARY FITTING

Walter Gruber, Stuttgart, and Horst Maag, Schonaich, both of Fed. Rep. of Germany, assignors to Hansa Metallwerke AG, Stuttgart, Fed. Rep. of Germany

Filed Sep. 20, 1988, Ser. No. 246,794
Claims priority, application Fed. Rep. of Germany, Sep. 21, 1987, 3731679; May 30, 1988, 3818342
Int. Cl.[5] F16K *31/40*; E03C *1/05*
U.S. Cl. 251—30.03 **10 Claims**

1. A sanitary fitting which can be controlled to provide continuously variable water flow without physical contact which comprises in combination

(A) a valve located in the path of water flow through said fitting,
(B) valve moving means operatively connected to said valve so that said valve can be moved from a completely open position to a completely closed position,
(C) at least one sensor operatively connected to said valve moving means so that within a given monitoring area movement will actuate said valve moving means which in turn will change the position of said valve,
the improvement comprising that
(1) said valve being a pilot controlled valve that includes
(a) a membrane (7) and a valve seat (4) which acts in conjunction with the membrane (7), said membrane having a pilot opening (7a, 47) and moves relative to the



valve seat according to the water pressure on either side of it,
(b) a closing device (8) for said pilot opening (7a, 47),
(c) a plunger (9) which is attached to said closing device (8) and which is adapted to move in a linear manner so as to cause said closing device (8) to either allow water flow through said pilot opening (7a, 47) or prevent water flow through said pilot opening (7a, 47), and
(2) said valve moving means comprising
(a) an electric motor (25, 39) having an output shaft (38) that rotates, and
(b) a device (32, 33, 20) which converts the rotary movement of the output shaft (38) into a linear movement of the plunger (9).

4,995,586

SOLENOID VALVE

Karl Gensberger, St. Ingbert, and Joachim Morsch, Marpingen, both of Fed. Rep. of Germany, assignors to Hydac Technology GMBH, Fed. Rep. of Germany

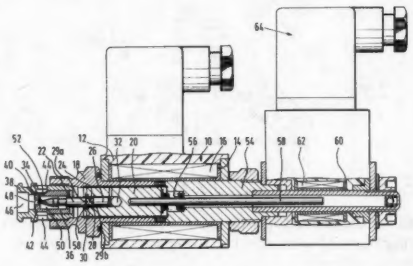
Filed Oct. 23, 1989, Ser. No. 425,231

Claims priority, application Fed. Rep. of Germany, Nov. 4, 1988, 8813817[U]

Int. Cl.[5] F16K *31/40*

U.S. Cl. 251—30.04 **19 Claims**

1. A solenoid valve, comprising:
a fluid flow passage with a cross section;
an operating magnet;
an armature mounted within said operating magnet for reciprocating movement;
a valve member connected to said armature by a sliding connection permitting limited relative axial movement between said valve member and said armature, movement of said valve member being controlled by said armature;
a valve spring biasing said armature toward a closed position of the valve;
a control member extending from said armature; and
electronic circuit means for controlling the cross section of said fluid flow passage, said circuit means including a coil with an exciter winding, said control member being received and movable in said coil, said circuit means includ-



ing a switching circuit for proximity switches having a restoring means connected with said coil, and a switching means for producing a switching hysteresis.

4,995,587

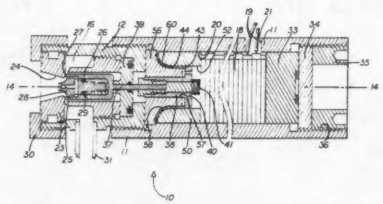
MOTION AMPLIFIER EMPLOYING A DUAL PISTON ARRANGEMENT

Richard C. Alexius, Orlando, Fla., assignor to Martin Marietta Corporation, Bethesda, Md.

Filed Nov. 3, 1989, Ser. No. 431,272

Int. Cl.[5] F16K *31/04*

U.S. Cl. 251—129.06 **15 Claims**



1. A mechanical motion amplifier useful for controllably converting an input displacement into an amplified output displacement, comprising:
(a) a first piston movable within a predetermined range of travel along an axis in response to said input displacement,
(b) a second piston movable within a predetermined amplified range of travel along an axis,
(c) force transmission means cooperating with said first and second pistons for effecting movement of said second piston in response to movement of said first piston, said force transmission means being an elastomer, and wherein.
(d) the relationship between said first and second pistons is such that movement of said first piston produces amplified movement of said second piston along its axis.

4,995,588

DRY-BREAK DISCHARGE VALVE ASSEMBLY FOR A LIQUID BULK CONTAINER

Dwight E. Nichols, Beatrice, Nebr., assignor to Hoover Group, Inc., Alpharetta, Ga.

Filed Nov. 13, 1989, Ser. No. 435,728

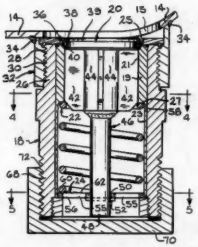
Int. Cl.[5] F16K *51/00*

U.S. Cl. 251—144 **3 Claims**

1. A dry break discharge assembly comprising:
a valve member having a stem;
a housing for said valve member, said housing having a seat at its upper end engageable with said valve member to

define a closed position for said valve member preventing liquid flow through said housing;

biasing means engaged with said valve member and operable to bias said valve member in one direction toward said seat, said stem being movable in a direction opposite to said one direction to move said valve member away from said valve seat to define an open position in which said valve member is spaced from said seat, and



a plurality of outwardly protruding fins on said stem slidably engaged with said housing in both said open and closed positions of said valve member, said plurality of fins being adjacent said seat, and said fins being operable to maintain said valve concentrically within said housing and in a concentric relation with said seat when said valve is moved between said open position and said closed position.

4,995,589

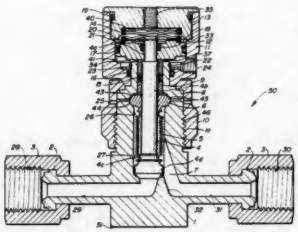
BELLOWS VALVE

David Adishian, Palos Verdes Estates, and Ira J. Silverman, Northridge, both of Calif., assignors to Sequoia Controls Company, Ltd., Carson, Calif.

Filed Jan. 29, 1990, Ser. No. 472,005

Int. Cl.[5] F16K *31/00*

U.S. Cl. 251—335.3 **17 Claims**



1. A bellows valve comprising:

a metal valve body having an inlet passage, an outlet passage, a valve cavity in fluid communication with said passages, and a valve seat in said cavity interfacing between said passages;

a translatable cylindrical valve stem, on end which is selectively cooperable with the valve seat to control the flow of fluid between the said passages, and another end of which is directly linked to an actuator assembly;

a bellows surrounding a portion of a lower diameter of said stem for isolating and sealing said stem from a system fluid passing through the valve chamber, such that the system fluid exerts an external compressive force on said bellows;

said valve cavity having an open end to accept said stem and said bellows;

wherein said actuator assembly is removably connected to said valve body and directly communicates with said stem and includes a positive linkage including an actuator piston connected to said valve stem and a flat spring of the wave or belleville type abutting an operating surface of said piston to control system fluid flow through the valve seat in one direction by the application of pressure to an actuator inlet port, and in the other direction by a force exerted in a return direction by said flat spring; and

further including guide means for one-piece construction for centering and sealing said stem, said guide means surrounding and spaced from said valve stem and positioned in sealing contact between said valve body and a metal valve bonnet surrounding an upper diameter of said stem.

4,995,590

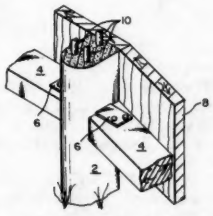
FENCE POST INSTALLATION

Gregg V. Close, 18915 SE. Petrovitsky Rd., Renton, Wash. 98058

Filed May 15, 1990, Ser. No. 511,190

Int. Cl.[5] E04H *17/16*

U.S. Cl. 256—24 **3 Claims**



1. A permanent fence post comprising:

an elongated main body portion fabricated of a permanent material, said main body portion including at least two parallel flat sides and a plurality of elongated reinforcing means extending substantially the entire length thereof, and a pair of spaced parallel rigid straps which extend between and are captured by the reinforcing means and which extend through the posts and extend outwardly thereof on the parallel sides to support an appropriate framework.

4,995,591

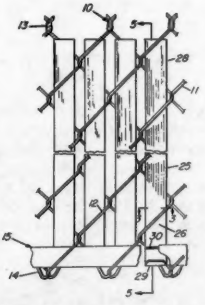
RETAINING LOCK FOR CHAIN LINK FENCE SLATS

William D. Humphrey, 909 W. Riverview Ave., Selah, Wash. 98942, and Harold Rothenberger, 1 Dorset Dr., Yakima, Wash. 98902

Continuation of Ser. No. 366,247, May 26, 1989, abandoned, which is a continuation of Ser. No. 229,710, Aug. 8, 1988, abandoned. This application Aug. 25, 1989, Ser. No. 399,419

Int. Cl.[5] B21F *27/00*

U.S. Cl. 256—34 **8 Claims**



1. In chain link fencing employing slats inserted vertically

through adjacent rows of fencing links, each slat being elongated and having a longitudinal dimension with spaced opposite ends, a width dimension and a thickness dimension less than the width dimension, a means for securing the slats within the fencing, comprising:

a notch formed in each slat near one end thereof, the notch extending across the width dimension and partly through the thickness dimension; and

a channel inserted through the fencing in a horizontal orientation to receive perpendicularly the ends of the slats having the notch formed nearby, the channel having inner surfaces and including a base portion and opposing walls, each of which has terminal edge portions spaced from said base portion, at least one of said terminal edge portions including an inwardly projecting barbed edge, the spacing between the respective terminal edge portions being less than said slat thickness dimension and said at least one barbed edge being engageable within the notch so as to lock the slat to the channel.

4,995,592

PURIFYING MOLTEN METAL

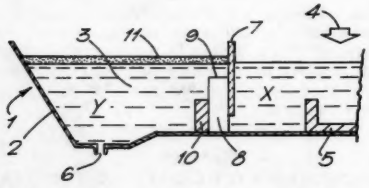
Neil J. Kegan, Birmingham; Ian Hitchens, Middlesborough; Thomas Robertson, Stockton, all of England, and Paul A. Whitehouse, Whyalla Playford, Australia, assignors to Foseco International Limited, Birmingham and British Steel PLC, London, both of, England

Filed Dec. 5, 1989, Ser. No. 446,567

Claims priority, application United Kingdom, Dec. 22, 1988, 8829918; May 20, 1989, 8911682

Int. Cl.[5] C21B *7/14*

U.S. Cl. 266—44 **26 Claims**



1. A method of purifying metal in a tundish comprising passing said metal in molten form between a zone of arrival and an outlet and past baffles located between said zone of arrival and outlet, in which the metal is passed past and between a vertical array of said baffles, the baffles of the array being spaced apart transversely across the tundish whereby flow of the molten metal is restricted to channels between the baffles; and wherein there is positioned immediately upstream of the array of baffles a weir extending transversely across the tundish for at least a substantial portion of its width and under which the metal must flow.

4,995,593

CRUCIBLE HAVING A MOVABLE DROSS COLLECTOR COMPRISING AN INDUCTION COIL

David A. Ford, Bristol; Gordon J. S. Higginbotham, Derby; David R. Pugh, Bristol, and Naresh Kumar, Birmingham, all of England, assignors to Rolls-Royce plc, England

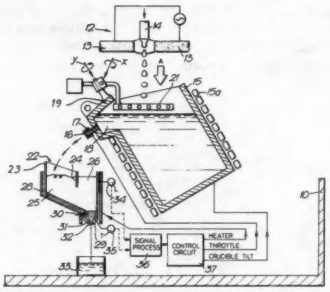
Filed Dec. 20, 1989, Ser. No. 453,999

Claims priority, application United Kingdom, Dec. 20, 1988, 8829689.2

Int. Cl.[5] F27D *11/06*

U.S. Cl. 266—227 **8 Claims**

1. A combined crucible and dross collector comprising a crucible having one side of a top thereof pouring means and movable dross collector, said dross collector comprising an electromagnetic induction coil means located near the top of



the crucible and mounted for movement relative to the crucible at least in a lateral sweeping movement.

4,995,594

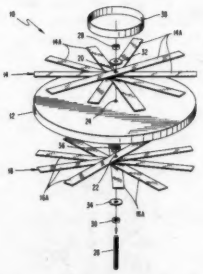
SLAG STOPPING PLUG FOR TAP HOLES OF METAL FURNACES CONTAINING MOLTEN MATERIAL

Robert M. Verbik, Merrillville, Ind., assignor to MPC, Metal Process Control A.B., Nyköping, Sweden

Filed Oct. 13, 1989, Ser. No. 420,894

Int. Cl.[5] C21C *5/48*

U.S. Cl. 266—272 **17 Claims**



1. A plug for temporarily closing a tap hole in a furnace containing molten material, comprising a plug element insertable into a tap hole, biasing means held in a retracted condition by a heat-destructible retaining member during insertion of the plug into the tap hole, said heat-destructible material being destructible by a temperature encountered in the tap hole, said biasing means being releasable in response to thermal destruction of said retaining member for urging said plug element against a surface of the tap hole.

4,995,595

SMELTING CRUCIBLE

Wolfgang Reuter, Niddatal, Fed. Rep. of Germany, assignor to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

Filed Jul. 3, 1986, Ser. No. 881,707

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1986, 3609836

Int. Cl.[5] C21B *3/00*

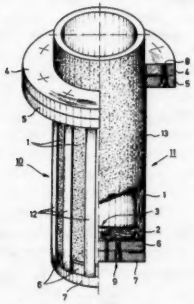
U.S. Cl. 266—275 **4 Claims**

1. A smelting crucible for smelting down a block of material by electrical heating for making precision castings, comprising:

a thin-walled casing of fibrous, mineral material for making precision castings, and including a base of fibrous, mineral

material with a tapping opening therein, the tapping opening being closed during smelting by a metal plate;

a flange at an upper edge of the crucible for mounting the crucible in a holding device; and



reinforcing means which can be stressed in tension and which connects the flange to the base of the crucible, the reinforcing means being so constructed as to allow gas to escape from the casing through the fibrous, mineral material thereof.

4,995,596

APPARATUS FOR REPAIRING A PERFORATED BRICK IN A METALLURGICAL VESSEL

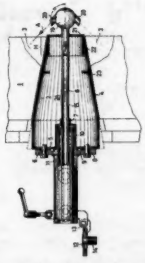
Hans Rothfuss, Taunusstein, and Peter Keutgen, Kreuzau, both of Fed. Rep. of Germany, assignors to Didier-Werke AG, Wiesbaden, Fed. Rep. of Germany

Filed Sep. 28, 1989, Ser. No. 413,675

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1988, 3833506

Int. Cl.[5] C21B *7/04*

U.S. Cl. 266—281 **25 Claims**



1. An apparatus for repairing a perforated brick employed in a wall of a metallurgical vessel and having an opening into which is to be fit a gas washing sink for introducing gas into molten metal within the metallurgical vessel, during which the perforated brick becomes worn, said apparatus comprising:

a casing having an outer contour corresponding to the outer contour of the gas washing sink and adapted to be inserted into the opening of the perforated brick upon removal therefrom of the gas washing sink, thereby to form a template defining the contour of the opening in a worn portion of the perforated brick;

a feed pipe, extending through and guided by said casing, for supplying therethrough repair material for repairing the worn portion of the perforated brick; and

a spray head, connected to said feed pipe, for directing the repair material toward the worn portion of the perforated brick, said spray head includes means for discharging the repair material toward the worn portion of the perforated brick in a direction extending from 90° to 180° with respect to the direction of flow of the repair material through said feed pipe.

4,995,597

HYDRAULIC SHOCK ABSORBER WITH TELESCOPIC CASINGS

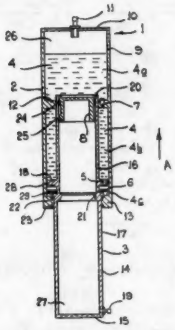
John J. Hatton, Highnam, United Kingdom, assignor to Dowty Rotol Limited, Gloucester, England

Filed May 2, 1989, Ser. No. 347,383

Claims priority, application United Kingdom, May 4, 1988, 8810538

Int. Cl.[5] F16F *9/14, 5/00, 9/06*

U.S. Cl. 267—64.15 **6 Claims**



1. A hydraulic shock absorber including:

a first casing member telescopically and sealingly engaged with a second casing member, said second casing member having a first section of reduced diameter in comparison to a second section;

oil reservoir means defined by the first and second casing members, which is divided into two distinct volumes by a one-way restrictor means attached to the second casing member;

a slidable piston mounted within the second casing member, so as to separate the oil reservoir means from a gaseous capacity; wherein the one-way restrictor means acts to restrict the flow of oil from the volume of the oil reservoir means defined by the first casing member and the second section of the second casing member to the volume of the reservoir means defined by the first casing member and the first section of the second casing member only and the volume of the oil reservoir means defined by the first casing member and the first section of the second casing member is further divided into two sections by a restrictor means.

4,995,598

RESILIENT MOUNTING

Peter L. Ingham, Leamington SPA, England, assignor to Dunlop Limited, United Kingdom

Filed Mar. 29, 1989, Ser. No. 330,135

Claims priority, application United Kingdom, Mar. 31, 1988, 8807658; May 11, 1988, 8811198

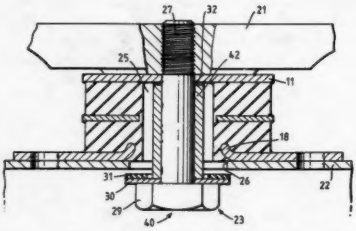
Int. Cl.[5] F16F *7/00*

U.S. Cl. 267—293 **7 Claims**

1. A resilient mounting comprising:

a resilient component comprising a substantially tubular body of elastomeric material located between and bonded to generally planar confronting surfaces of a pair of end members, said body of elastomeric material being reinforced by an embedded annular reinforcement element of generally planar form arranged to lie between and substantially parallel with said confronting surfaces of the end

members, and a first of said end members being of an annular form, a bummer member secured to a second of said members and located within the internal cavity defined by the tubular body to lie spaced from the internal surface of the tubular body when the mounting is an unstressed condition, said buffer member extending axi-



ally over substantially the entire length of said internal cavity, and

a buffer layer of elastomeric material provided between at least the buffer member and each of the reinforcement element and said first end member to prevent direct contact therebetween when the mounting is subject to transverse load.

4,995,599

MACHINIST'S VISE WITH ADJUSTABLE PRESSURE LIMITER

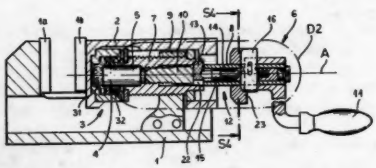
Ludwig Pflüger, Bitburg/Moetsch, Fed. Rep. of Germany, assignor to Carl Ullrich Peddinghaus, Wuppertal-Barmen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 247,109, Sep. 20, 1988, Pat. No. 4,940,216. This application Mar. 20, 1990, Ser. No. 496,983

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1987, 3732900; Mar. 24, 1989, 3909812

Int. Cl.[5] B23Q *3/08*

U.S. Cl. 269—32 **4 Claims**



1. A vise comprising:

a stationary jaw;

a movable jaw displaceable axially toward and away from the stationary jaw;

a nut fixed on the stationary jaw;

an outer hollow high-speed spindle threaded in the nut and formed with a radially open entrainment recess;

an inner low-speed spindle threaded in the outer spindle;

a piston-and-cylinder unit on the movable jaw having primary and secondary pistons respectively engaged by the outer and inner spindles;

a hand crank rotationally fixed on the inner spindle;

an entrainment pin displaceable transversely in the inner spindle between an entrainment position engaged in the recess and rotationally coupling the inner and outer spindles to each other and a freeing position clear of the recess and permitting relative rotation of the inner and outer spindles, the entrainment pin being formed with a axially directed camming surface;

a switching piece displaceable on the inner spindle between a high-speed position and a low-speed position;

means including an operating bolt displaceable along the inner spindle and engageable with the entrainment pin and with the switching piece for pressing the operating bolt into the camming surface in the low-speed position of the switching piece and thereby pulling the entrainment pin out of the recess to decouple the spindles and for freeing the operating bolt from the camming surface and coupling the spindles to each other in the high-speed position of the switching piece; and

a stop collar rotatable and axially displaceable on the outer spindle and having a front face engageable directly with the movable jaw and a back face formed with a plurality of pairs of diametrally opposite notches of different depths and complementary to the switching piece, and means for fixing said stop collar relative to said outer spindle, whereby the switching piece is engagable with a selected pair of notches, and whereby the collar limits displacement of the switching piece axially forward toward the movable jaw by different distances depending on which pair of notches the switching piece is engaged in and whereby the different distances correspond to different respective clamping forces.

4,995,600

GENERAL-PURPOSE FOLDING MACHINE

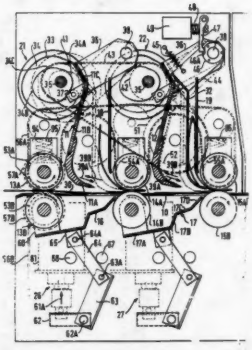
Josip Kovac, Ozoir-la-Ferriere, and André Ferreol-Ragotin, Evry, both of France, assignors to Societe Anonyme dite: Alcatel Satman, Bagneux, France

Filed Jan. 27, 1989, Ser. No. 302,650

Claims priority, application France, Jan. 29, 1988, 88 01063

Int. Cl.[5] B42C *1/00*

U.S. Cl. 270—45 **23 Claims**



1. General purpose document folding machine for folding a flat document into three folds comprising:

a folding module coupled to an input module receiving documents to be folded on one side and to an output module supplying the folded documents to the opposite side,

means defining a substantially horizontal main path through said modules,

first and second folding blades, means for pivotably mounting said first and second folding blades, one after the other, above said main path in said folding module,

first, second and third pairs of rollers along said main path in said folding module for advancing the documents, said first pair of rollers being mounted upstream of said first blade, said second pair of rollers being mounted between said first and second blades, and said third pair of rollers being mounted downstream of said second blade,

first and second guide flaps, means for substantially vertically mounting said first and second guide flaps above said main path in said folding module, adjacent to said second

and third pairs of rollers, respectively, on their upstream sides,

first and second deflector flaps, means for pivotably mounting said first and second deflector flaps, underneath said main path in said folding module, and extending just upstream of said second and third pairs of rollers, respectively, for movement between a nondiversion position below said path and a diversion position within said path to selectively divert documents from said main path against said first and second guide flaps, respectively, when individually actuated to diversion position,

detecting means for detecting the position of each document along the main path in said folding module and for controlling activation of each deflector flap to diversion position from nondiversion position and of each blade in folding position transversely to a diverted document, and

folding blade drive means for driving each blade in folding position having a longitudinal speed component parallel to the main path substantially equal to the speed of the document moving along the main path.

4,995,601

ANTI-SKEW SHEET FEEDING DEVICE FOR IMAGE FORMING APPARATUS AND SHEET STORAGE DEVICE FOR USE THEREIN

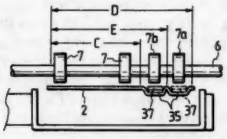
Masashi Ohashi, Tokyo; Yoshikuni Toyama, Yokohama; Kazuo Kagiura, Tokyo; Hiroyoshi Maruyama, Yokohama; Tatsuya Shiratori, Kawasaki; Masanari Shirai, Chigasaki, and Eiichi Ando, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 22, 1988, Ser. No. 288,458

Claims priority, application Japan, Dec. 28, 1987, 62-334072; Feb. 20, 1988, 63-037873

Int. Cl.[5] B65H *1/08*

U.S. Cl. 271—127 **10 Claims**



1. A sheet feeding device for use in an image forming apparatus provided with plural rotary members arranged respectively at a position opposed to a small sized sheet and at a position opposed to a large sized sheet, side by side axially, for separating and feeding the sheets supported on a sheet support plate, said sheet feeding device comprising:

a sheet support plate for supporting the sheets;

a recessed portion formed on said sheet support plate in a position to the rotary member which is at the position opposed to the large sized sheet;

a detachable auxiliary friction member for said sheet support plate, to be fitted in said recessed portion for forming a plane in feeding the large sized sheet and to be removed from said recessed portion in feeding the small sized sheet; and

a friction member on said sheet support plate in a position opposed to the rotary member which is at the position opposed to the small sized sheet.

4,995,602

FACSIMILE DEVICE

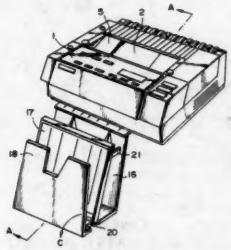
Yoshikazu Nakadai; Daiya Taranishi, both of Atsugi; Koichi Hirokawa, Kawasaki, and Nobuki Matsumoto, Miura, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 216,308, Jul. 8, 1988, abandoned. This application Feb. 16, 1990, Ser. No. 483,276

Claims priority, application Japan, Jul. 10, 1987, 62-171193

Int. Cl.[5] B65H *31/24*

U.S. Cl. 271—207 **20 Claims**



1. A facsimile device in which both a manuscript and a copied sheet are discharged in a direction outside of a front surface side at an operating portion of a main part of said facsimile device,

said facsimile device comprising:

(a) said main part of said facsimile device,

(b) a copied sheet tray for receiving a copied sheet,

(c) a manuscript tray for receiving a manuscript,

(d) a partition member positioned for separating said copied sheet tray and said manuscript tray from each other,

(e) connection means for unitarily combining bottom portions of said copied sheet tray and said manuscript tray to form a tray assembly, and

(f) junction means for jointing said tray assembly to said facsimile device main part,

wherein both of said manuscript tray and said copied sheet tray are joined to said facsimile device main part together with said partition member so as to be inclined in a substantially vertical direction which is substantially perpendicular to a direction of discharging said copied sheet and wherein said partition member comprises a single member connected with the unitarily combined bottom portions of said copied sheet tray and said manuscript tray, and is commonly usable for both said copied sheet tray and said manuscript tray.

4,995,603

AMUSEMENT SYSTEM INCLUDING RIDING CAPSULE DEVICE

Victoria K. Reed, 1778 Peck La., Cheshire, Conn. 06410

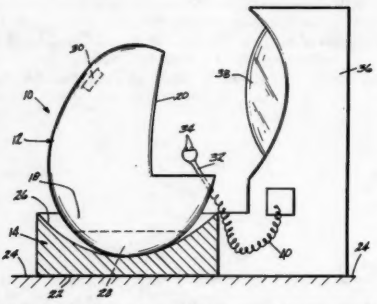
Continuation-in-part of Ser. No. 922,942, Oct. 24, 1986. This application Nov. 17, 1989, Ser. No. 437,753

Int. Cl.[5] A63G *31/02*

U.S. Cl. 272—18 **6 Claims**

1. An amusement system comprising a riding capsule device including a capsule member and a base member, said capsule member engaging said base member, a video screen visible to an occupant of said capsule member and means for displaying scenes on said screen, whereby visual stimuli are provided to the occupant and said capsule member is rotatable and tiltable with respect to said base member as said stimuli are observed,

wherein said capsule is rotatable and tiltable in a free rolling mode in which the motion of said capsule member will be



solely the result of reactions of the occupant to observed stimuli.

4,995,604

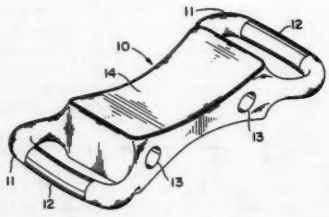
AEROBIC WATER WEIGHT

Ronald E. Lynch, and Bradley W. Smith, both of 3601-24th Ave. W. #201, Seattle, Wash. 98199

Filed Jan. 25, 1989, Ser. No. 301,651

Int. Cl.[5] A63B *21/072*

U.S. Cl. 272—122 **10 Claims**



1. A water weight for aerobic water exercise having a generally rectilinear shape, said weight comprising at least one handle, a pair of opposed inwardly curving leg grip surfaces, and one or more externally accessible weight pockets extending substantially across said rectilinear shape for receiving supplemental weights to adjust the buoyancy of said water weight.

4,995,605

PANEL FASTENER CLIP AND METHOD OF PANEL ASSEMBLY

David J. Conville, Hot Springs, Ark., assignor to Conlab Inc., Hot Spring, Ark.

Continuation-in-part of Ser. No. 67,369, Jun. 29, 1987, Pat. No. 4,782,642. This application Jun. 10, 1988, Ser. No. 206,085

Int. Cl.[5] E04B *1/40*

U.S. Cl. 52—770 **25 Claims**

1. A construction method for securely coupling together adjacent panels of gypsum board, sheet rock, masonite, insulation board, plywood or the like, which panels having abutting finished edges which, during wall assembly, terminate at random positions spaced apart from the wall studs, support columns or the like, said method comprising the steps of:

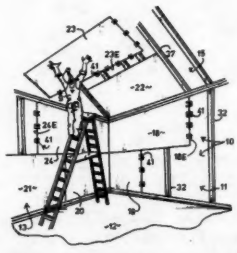
conventionally installing a first panel upon and between spaced apart studs or vertical support columns during assembly with an exposed edge of said first panel randomly positioned apart from the nearest stud or vertical support column over a hollow region of the wall structure;

applying at least one clip to the exposed, finished panel edge to prepare said first panel for coupling to a second panel finished edge, each of said clips comprising:

a generally rectangular and planar, perforated body portion adapted to be blindly penetrated by a self tapping screw, said body portion having a length greater than the thickness of said panel(s), a front, a rear, and a pair of spaced apart sides;

prong-like spring tab means integrally projecting forwardly from said clip body portion at said spaced-apart sides thereof, each of said spring tab means including a vertical portion generally perpendicular to said clip body portion and an integral offset horizontal flange portion oriented generally parallel with said clip body portion adapted to readily frictionally grasp a finished edge of a panel to sandwich same against said clip body; said spring tab flange portions spaced apart from said clip body portion a distance approximately equal to or less than the thickness of said panel;

installing a fastener through said first panel substantially within a region defined between said spring tab means horizontal portions so as to penetratingly engage said clip



body in a substantially random position thus permanently affixing said at least one clip to said first panel;

positioning a second panel having an exposed finished edge immediately adjacent to the exposed finished edge of said first panel over exposed planar portions of said at least one clip with said finished edges of said panels substantially abutting one another;

installing another fastener through said second panel immediately adjacent said spring tab means horizontal portions so as to permanently couple said second panel to said at least one clip body portion whereby said first and second panels are coupled together along their exposed finished edges and the panels are at least temporarily slightly angulated relative to one another by the clip with the clip forming the sole backup structure for the adjacent panels without additional mechanical linkage to a stud, support column or the like; and,

thereafter manually removing said horizontal flange portions of said spring tab means by bending them until breakage occurs along a predefined scored junction, whereby to ultimately construct an unobstructed wall surface for subsequent finishing.

4,995,606

BOARD GAME

Kiyoshi Kashimoto, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan

Filed Oct. 16, 1989, Ser. No. 421,781

Claims priority, application Japan, Dec. 19, 1988, 63-164227[U]

Int. Cl.[5] A63F *9/00*

U.S. Cl. 273—1 GG **7 Claims**

7. A game comprising:

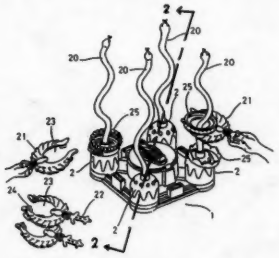
a base having a plurality of supports positioned thereon;

a plurality of first movable members respectively positioned within corresponding ones of said supports;

motor means for providing a drive force;

a linkage mechanism connected between said motor means and each of said first movable members so as to transmit said drive force to and to move each of said movable members;

a plurality of second movable members connectable to respective ones of said first movable members;



a plurality of third movable members having an opening for accepting respective ones of said second movable members; and

a manipulator including a handle and spaced apart protrusions for accepting a selected one of said third movable members.

4,995,607

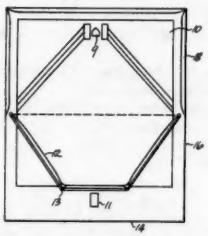
INTERACTIVE SPORTS TRAINING DEVICE

Terry B. Whitfield, 2729 Carmar Dr., Los Angeles, Calif. 90046

Continuation of Ser. No. 239,114, Aug. 31, 1988, abandoned. This application Dec. 12, 1989, Ser. No. 453,143

Int. Cl.[5] A63B *69/40*

U.S. Cl. 273—26 R **25 Claims**



1. An interactive sports training device comprising;

a screen mountable adjacent a playing area;

means for displaying a prompt to a player in the playing area;

sensor means for detecting the impact of an object hitting the screen and for generating a signal representative of the location of the impact on the screen;

programmable signal processing means, electrically connected to the sensor means and the prompt means, for generating a response signal dependent upon the sensor signal, and the displayed prompt and for adjusting the response signal to simulate an opposing player's ability to respond to an object hitting the screen; and

display means electrically connected to the signal processing means for displaying a message dependent upon the response signal.

4,995,608

STRINGED FRAME WITH ADJUSTABLE TENSIONING

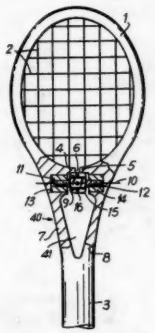
Friedrich-Wilhelm von Hackewitz, 8720 Schweinfurt, Lauerweg 2, Fed. Rep. of Germany

Filed Apr. 24, 1989, Ser. No. 342,227

Claims priority, application Fed. Rep. of Germany, Apr. 25, 1988, 3813872

Int. Cl.[5] A63B *51/12*

U.S. Cl. 273—73 E **5 Claims**



1. A game racket comprising a head portion joined to a rigid handle portion by way of an intermediate throat portion,

said head portion comprising an annular frame member extending in a plane and comprising where it joins the handle portion a first pair of adjacent brace members which define the sides of an opening in the throat portion and a second pair of end portions at the top of the throat opening and which are spaced from one another to form a gap, stringing connected across the annular frame member, said frame member and said first pair of brace members being slightly resilient and deformable in the said plane such that when the size of the said gap between the end portions is varied the stringing tension is varied,

an elastically deformable shackle member extending into the throat opening between the brace members and joined to and across the end portions, and shackle member being deformable substantially only in the circumferential direction of the frame member, thereby to reduce vibrations of the end portions,

adjusting means in the said gap between the end portions and bearing against the end portions and capable upon actuation to vary the size of the said gap and thereby vary the stringing tension, said adjusting means comprising a wedge having a threaded member and acting in the gap between the two end portions of the frame and pushing the two end portions substantially away from each other when the threaded member is rotated, said wedge being arranged perpendicular to the plane of the frame and being displaceable when the threaded member is rotated.

4,995,609

IRON GOLF CLUB HEADS

Richard E. Parente, Solana Beach; Richard De La Cruz, Pauma Valley, and Richard C. Helmstetter, Carlsbad, all of Calif., assignors to Callaway Golf Company, Carlsbad, Calif.

Continuation-in-part of Ser. No. 65,307, Jun. 23, 1987, which is a continuation-in-part of Ser. No. 19,702, Feb. 27, 1987, abandoned. This application Apr. 10, 1989, Ser. No. 204,704

Int. Cl.[5] A63B *53/02*

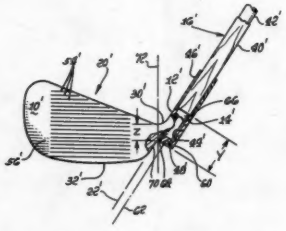
U.S. Cl. 273—80.2 **6 Claims**

3. The improvement in an iron golf club, comprising:

(a) an iron golf club head having a sole and having a blade with a toe end and a heel end,

(b) said head having a hosel disposed at said heel end of said

blade in a position juxtaposed to said blade and formed from the same continuous piece of metal as an integral part lapping said heel end from the upper edge of said heel end downwardly, and there being no bridge between said blade and said hosel below said hosel, said hosel extending from a level above the top of said blade down to said sole, said hosel having a through bore of substantially constant diameter extending from the top of said hosel down through said sole, said hosel being solid and inflexible and having a substantially even wall thickness from its lower portion to its top edge,



(c) said hosel having a dog-leg which in bottom view of said club head extends at an obtuse angle forwardly from said heel end of said blade,

(d) the lowermost sole end of said hosel being substantially squared with the longitudinal axis of said hosel forming a step substantially above the plane containing the sole of the club below said lowermost portion of said hosel thereby reducing the weight of metal of said hosel which can be redistributed to said blade, and

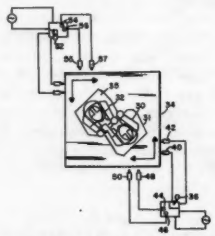
(e) a golf club shaft having a lower portion thereof fixedly secured within said bore; said lower portion of said shaft being inflexible relative to said hosel and extending completely to said lowermost end of said hosel.

4,995,610

ELECTRIC BOXING GAME

George J. Paoletti, 78 Melrose St., Arlington, Mass. 02174

Filed May 16, 1989, Ser. No. 352,260
Int. Cl.[5] A63F *13/06*
U.S. Cl. 273—85 F 20 Claims



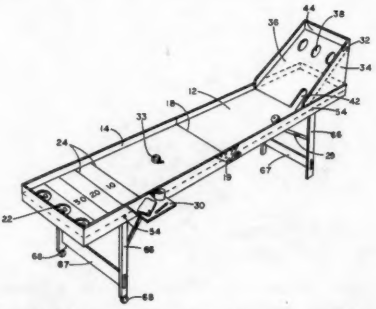
1. In a boxing game, the combination of two opposed doll boxers mounted on a support surface, each said boxer having foldable and extendable arms, electric means for controlling the body movements of at least one boxer and the arm movements of said one boxer against the other boxer, said electric means including an X-axis motor and a Y-axis motor for providing said body movements of said one boxer, manual controls connected to and operative upon said X-axis and said Y-axis motors, for controlling boxer body movement in a plane including said X-axis and said Y-axis and actuator means for controlling each arm extension and retraction of said one boxer.

4,995,611

MULTIMODE GAME BOARD

James F. Goldthorpe, Rte. 3, Box 2559, McMillan, Mich. 49853

Filed Dec. 17, 1987, Ser. No. 134,241
Int. Cl.[5] A63F *7/00*; A63B *39/00*; A47B *85/00*, *57/00*
U.S. Cl. 273—123 R 2 Claims



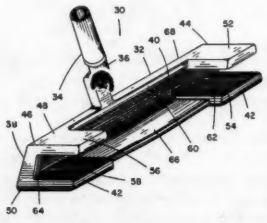
1. A rectangularly shaped, multimode game board comprising at least one generally flat playing surface upon which game pieces can be rolled or slid by one player, said game board being supported by a plurality of legs, and said legs being removable in pairs, whereby said game board can be folded into a comparatively flat configuration for transit and/or storage, a generally triangularly shaped device having an angled front surface usable at a selected location on at least one of said playing surfaces, said angled front surface having a plurality of holes therein, thus forming an opportunity for a player to test his or her skill by causing a game piece to move along at least part of the playing surface, up the angled front surface of said triangularly shaped device, and thence into one of said holes, and a return slot provided in a lower part of said angled front surface, such that the game piece can return under the influence of gravity back along the playing surface to the player.

4,995,612

GOLF CLUBHEAD IN A CORNER-BACK CONFIGURATION

Clifton D. Finney, 1057 Oak Hills Pkwy., Baton Rouge, La. 70810

[*] Notice: The portion of the term of this patent subsequent to Jan. 15, 2007, has been disclaimed.
Continuation-in-part of Ser. No. 289,908, Dec. 27, 1988, Pat. No. 4,898,387. This application May 31, 1989, Ser. No. 359,109
Int. Cl.[5] A63B *53/04*
U.S. Cl. 273—169 19 Claims



1. A golf clubhead comprising:

a. a front together with a back, a top, a sole, a heel, and a toe;

b. a striking means to strike a ball including a ball striking surface toward said front and an external rear surface toward said back;

c. a fastening means to affix a shaft;

d. a head weight means comprising at least one head weight

as inertial weight for said clubhead, and a binding means to attach said head weight means to said clubhead;

e. a toe section of said clubhead extending half the length of said clubhead from an extreme of said toe toward said heel to a central boundary defined by a vertical cut-plane positioned perpendicularly to the length line of said clubhead;

f. a toe weight means including at least one tow weight of the portion of said head weight means in said toe section as inertial weight;

g. a configuration of said toe section including:

(i) first and second substantial percentages of said toe weight means as an upper concentration of mass and a lower concentration of mass positioned adjacent said top and said toe and adjacent said sole and said toe, respectively, with each said concentration extending rearward from adjacent said rear surface of said striking means toward said back and between the extreme of said toe and said central boundary; and

(ii) a generally minimal first local width approaching the width of said striking means adjacent said top between said central boundary and said upper concentration, a generally maximal second local width due to said upper concentration extending rearward adjacent said top and said toe, a generally minimal third local width approaching the width of said striking means due to the generally open space between said upper and lower concentrations adjacent said toe, and a generally maximal fourth local width due to the rearward extension of said lower concentration adjacent said sole and said toe; and

(iii) said maximal second local width generally greater than each of said minimal first and third local widths, and said maximal fourth local width also generally greater than said minimal third local width; whereby

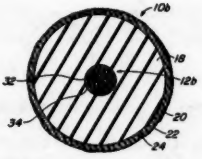
h. polar moments of inertia of said clubhead are enhanced to reduce twisting and loft changes when a golf ball is struck.

4,995,613

PROCESS FOR MANUFACTURING PRACTICE GOLF BALL

Grant W. Walker, Sacramento, Calif., assignor to Spin-Alizer Corporation, Sacramento, Calif.

Division of Ser. No. 284,722, Dec. 15, 1988, Pat. No. 4,886,275.
This application Sep. 28, 1989, Ser. No. 413,955
Int. Cl.[5] A63B *69/36*
U.S. Cl. 273—183 C **9 Claims**



1. A process of constructing a moderately resilient, energy-absorbing practice golf ball comprising the steps of:

a. binding dense metal into a core;

b. wrapping strips of uncured rubber into a thick layer around said core;

c. pressing the surface of said layer of uncured rubber into a substantially spherical shape;

d. pressing a layer of textile fabric into the surface of said uncured rubber layer, thereby yielding a fabric-covered ball;

e. curing said ball and fusing its layers together with elevated pressure and temperature.

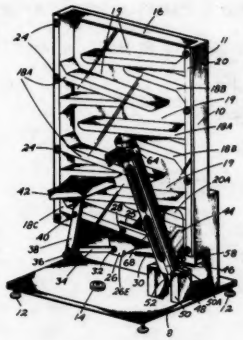
9. A moderately resilient, energy-absorbing practice golf ball constructed in accordance with the process of claim 1.

4,995,614

GOLF BALL DISPENSER AND SETTER

Mark L. Tange, 14991 Coutolenc Rd., Magalia, Calif. 95954

Filed Aug. 13, 1990, Ser. No. 567,165
Int. Cl.[5] A63B *57/00*
U.S. Cl. 273—201 **6 Claims**



1. An improved golf ball dispenser and setter apparatus sufficiently lightweight to be carried by hand, comprising;

a stabilizing base having a golf ball storage housing affixed to a top side thereof, said storage housing being a generally rectangular structure having internal baffles, said storage housing in an upper end thereof having an access opening providing means to allow insertion of golf balls into said storage housing, said storage housing having a ball dispensing opening positioned in a lower end thereof, said internal baffles positioned within said storage housing to form a vertically rising zigzagging open channel extending between said access opening and said ball dispensing opening, said zigzagging open channel sized and structurally arranged to organize and guide golf balls inserted into said storage housing through said access opening into a vertically rising zigzagging single column of golf balls;

a golf ball selector means, said selector means being a movably mounted member extending into said zigzagging open channel at said lower end of said storage housing, at least a portion of said selector means shaped and positioned within said zigzagging open channel to prohibit the passing of golf balls beyond said selector means and out said ball dispensing opening with said selector means in a first position, said selector means further structured to be repositioned into a second position, said selector means having means to select and allow passage of a single golf ball from a zigzagging single column of golf balls within said storage housing with repositioning of said selector means from said first position to said second position, ball directing means to direct a selected golf ball through said ball dispensing opening;

selector positioning means, said selector positioning means being a pivotal lever and linkage arrangement connected to said selector means, said selector positioning means including a pad positioned to allow pressing thereon by a golf club, said selector positioning means having means to reposition said selector means from said first position to said second position upon pressing on said pad;

biasing means of returning said selector means from said second position to said first position;

a ball delivery chute removably and pivotally affixed adjacent said ball dispensing opening, said ball delivery chute positioned to receive a golf ball exiting said storage housing through said ball dispensing opening, said ball delivery chute having means actuated by receipt of a golf ball to pivotally move over a playing surface and to deposit the received golf ball onto the playing surface;

biasing means providing retraction of said ball delivery chute after depositing of a golf ball onto a playing surface;

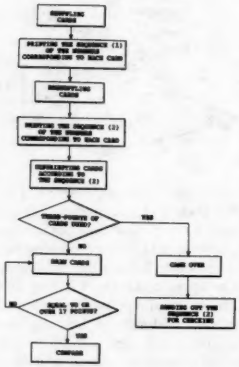
said selector means further having means preventing inadvertent passage of golf balls with said ball delivery chute removed.

4,995,615

METHOD AND APPARATUS FOR PERFORMING FAIR CARD PLAY

Kuan H. Cheng, 7F-1, No. 50, Hou Lung Street, Taichung City, Taiwan

Filed Jul. 10, 1989, Ser. No. 377,072
Int. Cl.[5] A63F *1/00, 9/22*
U.S. Cl. 273—292 3 Claims



1. A method for playing a card game involving the random production of cards in a single sequence, wherein all the cards in the sequence are equally likely to be produced so that an assumption of equal likelihood for computing probabilities is valid, said method comprising the steps of: (a) printing out a single random sequence of the cards on a sheet on which the sequence is covered so as not to be visible by players before and during the play; (b) completing the play of the cards by producing them one at a time in the foregoing sequence; and (c) after the play is completed, uncovering the printed sequence so that it can be compared with the produced sequence.

4,995,616

OPTICAL TRANSCEIVER SYSTEM

Dennis W. Davis, 10740 Eland St., Boca Raton, Fla. 33428, and Russell D. Davis, 8905 NW. 28th Dr., Apt. A, Coral Springs, Fla. 33065

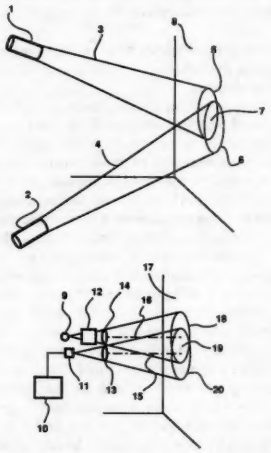
Filed Jan. 23, 1990, Ser. No. 468,686
Int. Cl.[5] F41J *5/08*
U.S. Cl. 273—312 15 Claims

1. A system for the projection of light patterns from separate sources onto distant surfaces and the detection of spatial and temporal coincidence of said light patterns on said distant surfaces, said system comprising a multiplicity of transceiver devices, said transceiver device further comprising;

(a) an intensity modulated, visible light-emitting device with said modulation characteristic of particular said transceiver device;

(b) light collecting, image forming and focusing means incident to light emanated from said visible light emitting device for projecting a visible light pattern on a distant surface along a first optical axis;

(c) light collecting, focusing and detector means located along a second optical axis in close proximity and parallel to said first optical axis, with a field-of-view that allows said detector to receive light only from the region of said projected visible light pattern on said distant surface;



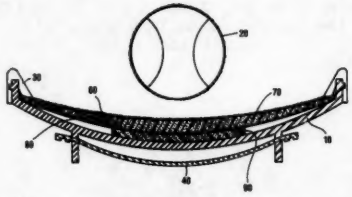
(d) electronic means for processing electronic signals resulting from optical detection of said received light, said processing means responsive to said modulation characteristic of other said transceiver devices.

4,995,617

ARTICLES OF PLAY FOR USE IN THE GAME OF CATCH

Miryoung Lee, 1034 E. Walnut Creek Pkwy., West Covina, Calif. 91790

Filed Mar. 8, 1990, Ser. No. 490,301
Int. Cl.[5] A63B *67/00*
U.S. Cl. 273—346 4 Claims



1. Articles of play or sport, for use with the game of catch, comprising:

a missile having substantially all of its surface defined by a multitude of irregular filamentary formations, and

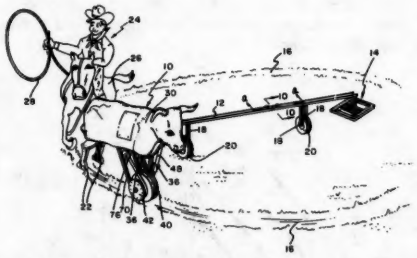
a multi-layer mitt for use by each participant in the game of catching said missile, said multi-layer mitt including a rigid concave rear layer, a first intermediate flexible layer, a second intermediate flexible layer, and a front layer having substantially all of its front surface defined by a multitude of irregular filamentary formations, said first intermediate flexible layer occupying a surface area less than the surface area of said rear layer, and said second intermediate flexible layer occupying a surface area substantially equal to the surface area of said rear layer, said front layer being retained in place by a retaining ring with an inner edge of said retaining ring extending over a portion of said front layer, whereby said front layer is prevented from separating from said second intermediate flexible layer.

4,995,618

MOVEABLE ROPING EXERCISE TARGET

Ty Panzner, Box 961, Dighton, Kans. 67839

Filed Feb. 28, 1990, Ser. No. 486,230
Int. Cl.[5] F41J 9/00
U.S. Cl. 273—367 11 Claims



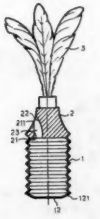
1. A device animating a steer comprising a pedestal member; a guide arm rotatably secured to said pedestal member; a frame means, connected to said guide arm, for supporting a drive means for driving the frame means; a surface engaging means mounted to said frame member and adapted to effect movement of said frame means along an operating surface; drive means mounted on said frame means and operatively coupled to said surface engaging means for driving same, said drive means includes a power means supported by said frame means for effecting movement of the surface engaging means, a clutch operatively connected to said power means, a first speed reduction assembly engaged releasably to said clutch, and a second speed reduction assembly operatively engaged to said first speed reduction assembly and to said surface engaging means.

4,995,619

SHUTTLECOCK

Kuo H. Hwang, 2F3R, No. 14, Ching Chung St., Tainan, Taiwan

Filed Apr. 17, 1990, Ser. No. 510,032
Int. Cl.[5] A63B 67/18
U.S. Cl. 273—417 4 Claims



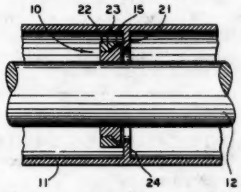
1. A shuttlecock comprising a hollow elastic body shaped as a corrugated cylinder having a closed bottom at one end and able to shrink lengthwise, a head shaped as a curved cone extending up from the other end of the hollow elastic body and having a curved through hole made up of a curved hole face and a flat hole face, the curved through hole having an opening in a proper point of the curved face of the head and communicating with the hollow interior of the hollow elastic body, and a tail having a plurality of feathers or the equivalent and extending up from the head.

4,995,620

SELF-COMPENSATING SEAL FOR A ROTATING SHAFT

Michael J. Zawaski, and Don B. Van Possen, both of Alliance, Ohio, assignors to Westmont Inc., Minerva, Ohio

Filed Jan. 3, 1989, Ser. No. 292,760
Int. Cl.[5] F16J 15/34, 15/54, 15/00
U.S. Cl. 277—25 8 Claims



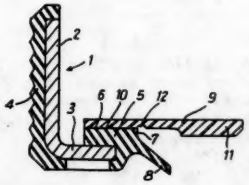
1. A seal for a rotating shaft comprising a seal ring having radially inner and radially outer edges, said seal ring including a plurality of seal sections, each of said seal sections being triangular in shape and being positioned adjacent to another seal section, said seal ring being in the shape of a shell of the zone of a sphere, a ring housing having a channel therein, said ring housing substantially encircling the shaft such that said ring housing has a circumferential surface in direct opposition to the shaft, said ring housing channel engaging said radially inner edge of said seal ring, means to prohibit circumferential movement of said seal ring within said ring housing channel, means to affix said ring housing to the shaft so that said ring housing and said seal ring rotate with the shaft, said means to affix said ring housing including engagement of the shaft with said circumferential surface in direct opposition to the shaft, and a wear plate being disc-like in shape and having a radially extending surface and an axially extending surface and engaging said radially outer edge of said seal ring at said radially extending surface, whereby the centrifugal forces generated by the rotation of the shaft causes said seal sections to move within said ring housing channel in a direction toward said wear plate, so that said engagement between said seal sections and said wear plate is maintained despite wearing of said seal sections.

4,995,621

RADIAL SEAL RINGS

Serge Devouassoux, Langres; Michel Marchiset, Chalindrey, and Michel Saxod, Langres, all of France, assignors to Procal, Langres, France

Filed Jul. 18, 1986, Ser. No. 886,617
Claims priority, application France, Jul. 18, 1985, 85 11007
Int. Cl.[5] F16J 15/32
U.S. Cl. 277—37 5 Claims



1. In a radial seal ring comprising:
a metal annular frame;
an intermediate annular flexible elastomeric body, attached to said frame, having a first peripheral surface facing said frame and a second peripheral surface facing away from said frame, and a support surface intersecting said second peripheral surface; and

a sealing member attached to the support surface of said intermediate body, said sealing member having a first portion with a bonding surface facing the support surface of the intermediate body and adhered thereto, and a second portion, comprising a sealing lip, extending radially from said first portion, away from said frame; the improvement wherein

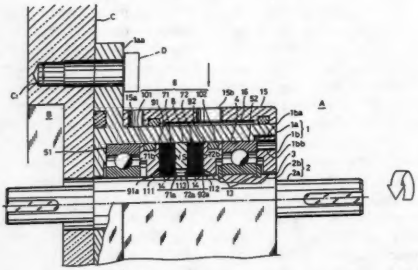
said sealing member has a circumferential axially facing groove between its first and second portions, adjacent said second peripheral surface, whereby said groove provides a predictable locus for bending of said sealing member, thereby avoiding bending at said bonding surface which would tend to result in delamination.

4,995,622

MAGNETIC FLUID SEAL DEVICE

Toshihiko Fuse, Sanda, Japan, assignor to Nippon Pillar Packing Co., Ltd., Osaka, Japan

Filed Feb. 7, 1989, Ser. No. 306,853
Int. Cl.[5] F16J *15/00, 9/00*
U.S. Cl. 277—80 **4 Claims**



1. A magnetic fluid seal device mounted about the circumference of a magnetic rotating element, comprising:

a plurality of sets of pole pieces, each set having at least a first and second magnetic disk of different inside diameters alternately joined together; and

a magnet disposed between adjacent sets of pole pieces, wherein:

the first magnetic disks in each set have an inside diameter smaller than the inside diameter of the second magnetic disks in their respective set;

a gap is formed between the magnetic rotating element and each of the first magnetic disks in each set, in which magnetic fluid is captured, said gap being set to be less than the thickness of the second magnetic disks;

the magnetic flux density in each gap is set larger than the saturation magnetization of the magnetic fluid captured in each gap; and

the thickness of the first magnetic disks in each set is established between 0.02 and 1.0 mm.

4,995,623

SEALING DEVICE FOR RECIPROCATING MEMBER

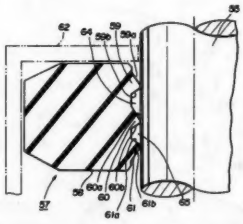
Noriyuki Wada, and Satoshi Yamanaka, both of Fukushima, Japan, assignors to NOK Corporation, Tokyo, Japan

Filed Sep. 9, 1988, Ser. No. 242,742
Claims priority, application Japan, Sep. 11, 1987, 62-139213[U]; Sep. 17, 1987, 62-142020[U]
Int. Cl.[5] F16F *9/36*
U.S. Cl. 277—208 **1 Claim**

1. A sealing device for use in combination with a reciprocating member having an outer surface, said sealing device comprising:

a sleeve surrounding the reciprocating member, said sleeve having an internal surface facing said reciprocating member, said internal surface having at least two axially spaced apart sealing lips surrounding and projecting towards said reciprocating member, said axial spacing defining a chamber between axially adjacent sealing lips, each sealing lip having a tip in contact with the outer surface of said reciprocating member, and each sealing lip having a first side facing internal fluid and an axially opposite second side facing atmosphere; and

means provided on the sealing lip closest to said internal fluid for introducing internal fluid into said chamber between said sealing lip closest said internal fluid and the next adjacent sealing lip;



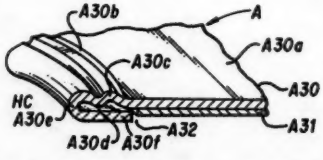
said means including tapered surfaces on the sealing lip closest to said internal fluid, said tapered surfaces being connected to said tip so that the tapered surface adjacent to said internal fluid makes a smaller angle to said reciprocating member than said tapered surface facing the atmosphere does and the sealing lip axially next to said sealing lip closest to said internal fluid also has tapered surfaces, said tapered surface of said axially next sealing lip facing said internal fluid making a greater angle to the surface of said reciprocating member than said tapered surface of said axially next sealing lip facing the atmosphere.

4,995,624

STEEL LAMINATE GASKET WITH WIDE SEALING AREA

Tsunekazu Udagawa, Ichikawa, and Susumu Inamura, Tokyo, both of Japan, assignors to Ishikawa Gasket Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 243,528, Sep. 12, 1988, Pat. No. 4,938,488. This application Nov. 20, 1989, Ser. No. 439,666
Int. Cl.[5] F16J *15/08*
U.S. Cl. 277—235 B **9 Claims**



1. A steel laminate gasket for an internal combustion engine having at least one hole therein, comprising:

a first plate having at least one first hole therein corresponding to the hole of the engine, said first plate including a base portion, at least one curved portion integrally formed with the base portion to extend laterally with respect to the base portion to define the first hole, at least one flange integrally formed with the curved portion and being located at a side of the base portion to extend substantially parallel to the base portion, at least one side wall formed on one of the base portion and the flange adjacent the curved portion to surround the first hole so that the distance between the flange and base portion inside the side wall is greater than the distance between the flange and

base portion outside the side wall, and at least one first bead situated between the side wall and the curved portion to extend toward the other of the base portion and the flange, and

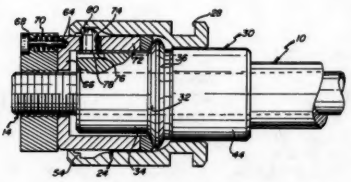
a second plate situated at a flange side of the first plate, said second plate having at least one second hole therein, the diameter of the second hole being larger than the outer diameter of the flange so that when the first and second plates are assembled, the flange is located inside the second hole.

4,995,625

MECHANISM FOR PREVENTING INADVERTENT CHUCK RELEASE

Florian I. Nowak, 16 Dean Dr., Newington, Conn. 06111

Filed Jan. 8, 1990, Ser. No. 461,808
Int. Cl.[5] B23B *31/20*
U.S. Cl. 279—1 C **8 Claims**



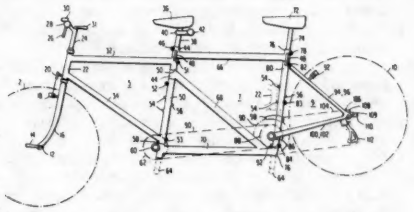
1. In a collet-operating mechanism, including a first part having a longitudinal axis of rotation; a collet-closing member slidably assembled with said first part for limited axial movement relative thereto along said axis of rotation; force-transmitting means operatively interposed between said first part and said closing member for effecting such relative axial movement in one direction; and an operating member slidably assembled with said first part and said closing member for axial movement along said axis of rotation between first and second positions, said operating member being disposed outwardly of at least one of said first part and said closing member and acting upon said force-transmitting means in said first position thereof as to cause said transmitting means to effect such relative movement in said one direction, and permitting such relative movement in the direction opposite to said one direction in said second position thereof, whereby said closing member can effect closure of a collet operatively connected thereto; the improvement wherein said operating member has means defining an inwardly opening recess portion thereon, said means including at least one engagement element; and wherein one of said first part and said closing member has a circumferential outer surface portion thereon, disposed proximate said recess-defining means of said operating member, and has a plurality of engagement components thereon movable, on axes oriented radially with respect to said axis of rotation, alternatively between withdrawn and extended positions with said engagement components disposed, respectively, inwardly of said circumferential surface portion and in protrusion therebeyond said recess portion and said engagement components being so configured and positioned that, with said operating member in said first position and said engagement components in said extended positions thereof, said components can partially enter said recess portion and engage said engagement element so as to inhibit movement of said operating member toward said second position thereof, whereby centrifugal forces generated by rotation of said mechanism can act upon said engagement components to maintain said components in said extended positions to thereby produce such inhibition to movement of said operating member during such rotation.

4,995,626

FOLDABLE TANDEM BICYCLE

Harry D. Montague, 3042 Newark St., N. W., Washington, D.C. 20008

Filed Jan. 13, 1989, Ser. No. 296,732
Int. Cl.[5] B62K *3/12, 15/00*
U.S. Cl. 280—231 **20 Claims**



1. A foldable tandem bicycle frame comprising:

a front frame,

a rear frame,

an integral center frame including

a first seat tube, a second seat tube, said front frame and said center frame foldable with respect to each other about said first seat tube,

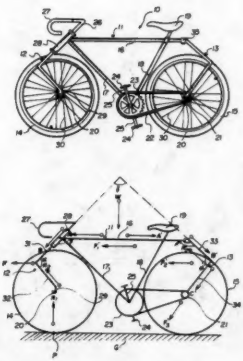
said center frame and said rear frame foldable with respect to each other about said second seat tube, whereby said front and rear frames fold about respective first and second seat tubes to fold said tandem bicycle frame and said center frame is unaltered in configuration irrespective of whether said tandem frame is open or folded.

4,995,627

BICYCLE UTILIZING THE VECTOR SYSTEM

Jae S. Yun, 103 Cambridge La., Glendale Heights, Ill. 60139

Continuation-in-part of Ser. No. 243,834, Sep. 13, 1988, abandoned. This application Mar. 9, 1990, Ser. No. 491,202
Int. Cl.[5] B62K *3/02, 19/00;* **B62M** *1/02*
U.S. Cl. 280—261 **12 Claims**



1. A bicycle having a front steering wheel and a single driven rear wheel which comprises:

a triangular frame, said triangular frame containing a front joint portion, a rear joint portion, and a bottom joint portion,

a front fork with a first end rotatably connected to said front joint portion of the triangular frame, said front fork hav-

ing a front bent portion with a 90° bend and an extended vertical arm at a second end thereof, said extended vertical arm attached to a front axle of said front steering wheel, whereby the front fork, the front bent portion, and the extended vertical arm are a composite structure so that the front fork is connected to the front steering wheel,

a rear fork outwardly connected to said rear joint portion of the triangle frame, said rear fork having a rear bent portion with a 90° bend opposite to said bent portion of said front fork, and said rear fork being pivotably attached to a rear axle of said single driven rear wheel,

a handle bar extending from said first end of the top of the front fork through said front joint, and

a driven chain engaged with a pedal sprocket which is mounted to said bottom joint of the triangle frame, said driven chain operatively engaged with a rear wheel sprocket which is mounted on said single driven rear wheel, wherein the triangular frame, front fork, and rear fork of the bicycle comprise a vector system including component and resultant forces which collectively provide a forward force when weight is placed on the top of the triangular frame so that the bicycle may be smoothly driven forward with little effort being required by the rider.

4,995,628

STANDING FRAME ASSEMBLY FOR USE WITH WHEELCHAIR

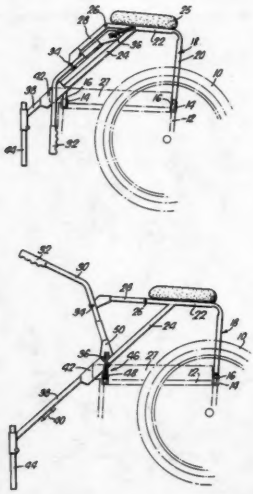
Roger Orpwood, Bath, and Ian D. Swain, Wiltshire, both of England, assignors to Hodgkinson & Corby Limited, London, England

Filed Jun. 23, 1989, Ser. No. 369,498

Claims priority, application United Kingdom, Jun. 23, 1988, 8814979

Int. Cl.[5] A61G 5/14

U.S. Cl. 280—304.1 **9 Claims**



1. A standing frame assembly for use in conjunction with a wheelchair, said assembly comprising:

an arm-rest frame detachably and fixedly mountable on the wheelchair such that when mounted, said arm-rest frame is restrained from movement relative to the wheelchair;

a holding member mounted to be rotatably movable relative to said arm-rest frame and movable from a lowered retracted position in front of the wheelchair to a raised position in which it is arranged in front of and above the seat of said wheelchair, and in which it may be used to assist the user in standing up from the wheelchair;

a ground engaging member;

a pivotal connection between said ground engaging member and said holding member;

means for mounting said ground engaging member whereby it is slidably movable relative to said arm-rest frame and movable to a retracted position with the holding member to its lower position and it is in a ground engaging position in front of the wheelchair when the holding member is in the raised position;

a locking means provided to prevent any relative rotation of said holding and ground engaging members when the ground engaging member is in the ground engaging position.

4,995,629

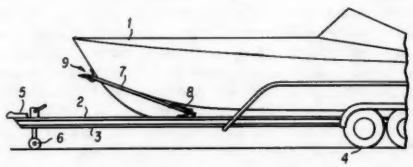
BOAT HULL LATCHING DEVICE HAVING POSITIVE RETENTION MEANS

Ralph Poppell, Vero Beach, Fla., assignor to Float-On Corporation, Ft. Pierce, Fla.

Filed Mar. 7, 1990, Ser. No. 489,955

Int. Cl.[5] B60P 3/10

U.S. Cl. 280—414.1 **4 Claims**



1. A boat latching device for securing the hull of a boat to a trailer having a bow stop bar mounted thereon, said boat latching device comprising:

a latch-catch member having a substantially U-shape to form a recess for receiving said bow stop bar, said latch-catch member having a first end and a second end, the first end of said latch-catch member being mounted to the hull of said boat;

an overcenter pawl member having camming surfaces and an overcenter portion, said pawl member being pivotally mounted to said second end of said latch-catch member for movement between a locking position in which said pawl member retains said bow stop bar within said recess and an unlocking position in which said pawl member permits the release of said bow stop bar from said recess, said camming surfaces comprising a locking cam surface on one side of said overcenter portion and an unlocking cam surface on another side of said overcenter portion; and

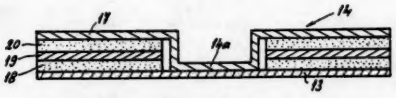
resilient spring means mounted on said latch-catch member, said resilient spring means pressing against said locking cam surface when said pawl member is in said locking position for holding said pawl member in said locking position and pressing against said unlocking cam surface when said pawl member is in said unlocking position for holding said pawl member in said unlocking position.

4,995,630

VIBRATION DAMPER FOR SKI

Yves Piegay, Voiron, France, assignor to Skis Rossignol S. A., Voiron, France

Division of Ser. No. 234,968, Aug. 19, 1988, which is a division of Ser. No. 132,730, Dec. 11, 1987, abandoned, which is a continuation of Ser. No. 814,110, Dec. 27, 1985, abandoned. This application Mar. 23, 1989, Ser. No. 328,000
Claims priority, application France, Dec. 27, 1984, 84 20189
The portion of the term of this patent subsequent to Sep. 12, 2006, has been disclaimed.
Int. Cl.[5] A63C 5/075
U.S. Cl. 280—602 3 Claims



1. A ski having a length of about 2 m, an upper surface, a turned-up front end, a rear end, a central ski binding and a vibration damper system between 5 cm and 20 cm long and disposed on said upper surface, the vibration damper system comprising

two pairs of viscoelastic sheets sandwiching a damper plate with a high modulus of elasticity between them and secured on said upper surface by raised wings of a top plate having a depressed central region formed with longitudinal slots; and

bolts engaged through the slots with the ski for securing the assembly to the ski with longitudinal adjustability.

4,995,631

MONO-SKI DEEP SIDE CUTS FOR USER STABILITY CONTROL

Kent Hunter, 3017 E. 9400 S., Sandy, Utah 84092

Continuation of Ser. No. 278,560, Dec. 1, 1990, abandoned. This application May 11, 1990, Ser. No. 522,478
Int. Cl.[5] A63C 5/03
U.S. Cl. 280—607 2 Claims

1. A mono-ski having an elongate body to which a skier's boot bindings are intended to be mounted such that a skier's boots are symmetrically mounted along each side of the longitudinal axis of the ski and pointing in the longitudinal direction, comprising

a shovel section separated from a tail section by a waist section, each of said sections having a uniform cross-sectional thickness and a symmetrically orientation along a longitudinal axis which extends along the center of the elongate body, the cross-sectional thickness of said waist section being thicker than the cross-sectional thickness of said shovel and tail sections, said shovel section, waist section and tail section forming a continuous bottom surface of said ski,

said shovel section having a widest portion, measured perpendicularly from said longitudinal axis, which is at least 30 percent wider than a narrowest portion of said waist section and approximately 50 percent wider than the widest portion of said tail section similarly measured perpendicularly from said longitudinal axis, said shovel section also having a front end portion, said front end portion being curved upward in a uniform arching shape which extends away from a plane defined by said bottom surface,

said tail section also having a widest portion measured perpendicularly from said longitudinal axis, which is wider than said narrowest portion of said waist section, and narrower than said widest portion of said shovel section, said tail section also having an end portion, said tail section end portion being curved upward in a uniform arching shape which extends away from the plane defined by said bottom surface, said widest portion of said tail section being spaced away from, so as to be excluded from said end portion of said tail section, and said end portion of said tail section forming an edge which constitutes a perimeter of said tail section end portion, said perimeter edge being semicircular in shape,

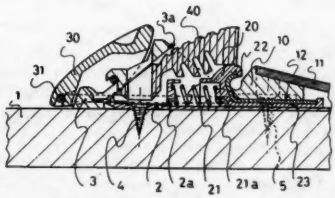
whereby when the mono-ski is in contact with a relatively flat sloping surface including covered with snow, rotation of the ski along the ski's longitudinal axis causes shovel and tail contact areas of the ski which contact said flat sloping surface to be concentrated in the shovel section and the tail section in the widest portions thereof and away from the end portion of said shovel section, away from the end portion of said tail section and away from the waist section, said tail section having a smaller contact area than said shovel section, whereby downward force on the tail section of the ski causes greater pressure on the snow at the tail section contact area than a similar force applied to said shovel section.

4,995,632

BINDING DEVICE FOR SKI BOOT

Eric Girault, Seynod, and Paul Arnulf, Alby sur Cheran, both of France, assignors to Salomon S. A., Annecy Cedex, France

Filed Apr. 12, 1990, Ser. No. 508,128
Claims priority, application France, Apr. 12, 1989, 89 05166
Int. Cl.[5] A63C 9/086
U.S. Cl. 280—615 8 Claims



1. A mounting device for a ski boot on a cross-country ski, said ski boot having a transverse hinge pin at its front end, said mounting device comprising a stationary jaw and a moveable locking jaw designed to lock said hinge pin (2) of said ski boot in position while leaving said hinge pin free to rotate, and said moveable locking jaw is capable of being displaced toward said stationary jaw (10) in order to clamp said hinge pin, said stationary jaw (10) delimiting a slide track (12) for a guide piece (23) connected to said movable locking jaw (20), said slide track (12) being arranged between two screws (5) for mounting said device to said cross-country ski, said screws

having screw heads (**5***a*), and said slide track (**12**) extending transversely beneath at least one part of a support zone (**10***a*) of each of said screw heads (**5***a*).

4,995,633

STRUT TYPE SUSPENSION

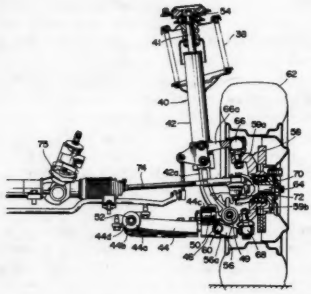
Toshiyasu Santo, Susono, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Aug. 31, 1989, Ser. No. 401,878

Claims priority, application Japan, Sep. 5, 1988, 63-220409; Dec. 27, 1988, 63-330582; Feb. 8, 1989, 1-27589

Int. Cl.[5] B60G *3/20*

U.S. Cl. 280—673 **9 Claims**



1. A strut type suspension, in which a strut has an upper strut portion and a lower strut portion capable of sliding relative to the upper strut portion, said upper strut portion is swingably connected to a vehicle body, and said lower strut portion is swingably connected to a suspension arm extending in a lateral direction of the vehicle body, comprising:

a wheel carrier having an upper portion located above a rotary axis of a wheel and a lower portion located below said rotary axis, said upper portion being swingably connected to said lower strut portion through a ball joint; and

a control link having one end connected to said suspension arm, said end adapted to be swingable around an axis extending in a longitudinal direction of the vehicle body and the other end swingably connected to said lower portion of said wheel carrier,

wherein the connection point of said control link and said suspension arm is provided in such a position as to be displaced outward in the lateral direction of the vehicle body relative to the connection point of said lower strut portion and said suspension arm as said suspension arm is swung in a bounding direction from a reference condition.

4,995,634

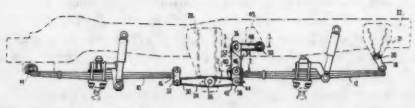
EQUALIZING SUSPENSION ARRANGEMENT FOR TANDEM STEERING AXLES WITH COORDINATED GEOMETRY CONTROL OF NO. 2 STEERING AXLE

Maxwell E. Evans, Queensland, Australia, assignor to Mack Trucks, Inc., Allentown, Pa.

Filed Aug. 11, 1989, Ser. No. 392,557

Int. Cl.[5] B60G *5/00*

U.S. Cl. 280—682 **4 Claims**



1. In a vehicle having tandem steering axles including a front axle and a rear axle and front and rear springs for mounting said axles, an arrangement for coordinating said axles through the full range of movement thereof, said arrangement comprising

(a) an extended shackle pivotally connected to the front end of said rear spring;

(b) a rocker beam mounted on the frame of the vehicle between the rear end of said front spring and the front end of said rear spring and pivotally connected to said extended shackle; and

(c) means for causing movement of said front end of said rear spring to be controlled to a substantially vertical path.

4,995,635

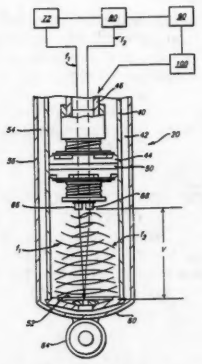
ULTRASONIC DOPPLER VELOCITY SENSING WITHIN A HYDRAULIC ACTUATOR

Yoram Guy, Ann Arbor, Mich., assignor to Monroe Auto Equipment Company, Monroe, Mich.

Filed Mar. 21, 1990, Ser. No. 496,673

Int. Cl.[5] B60G *17/08*

U.S. Cl. 280—707 **27 Claims**



1. A hydraulic actuator connecting the sprung and unsprung portions of a vehicle, said hydraulic actuator operable to measure changes in the relative velocity between the telescopically movable components thereof, said hydraulic actuator comprising:

a cylinder forming a working chamber operable to store damping fluid;

a piston disposed within said cylinder defining a first and a second portion of said working chamber, said piston being movable within said cylinder;

first transducer means for emitting sound waves through damping fluid contained within said second portion of said working chamber;

means for driving said first transducer means so as to cause said first transducer means to emit sound waves;

means for reflecting the sound waves emitted by said first transducer means, said reflecting means being disposed within said cylinder;

second transducer means for receiving sound waves reflected by said reflecting means;

measuring means for determining the change in frequency between the sound waves received by said second transducer means and the sound waves emitted by said first transducer means and generating an output in response thereto; and

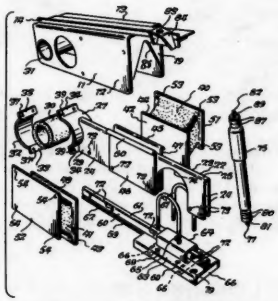
means for calculating the relative velocity of said piston within said cylinder in response to said output from said measuring means.

4,995,636

TRAILING ARM MODULAR AXLE SUSPENSION UNIT

Ron E. Hall, Elkhart, Ind., and David E. Heitzmann, Union, Mich., assignors to MOR/ryde, Inc., Elkhart, Ind.

Filed May 26, 1989, Ser. No. 358,006
Int. Cl.[5] B60G *11/62*
U.S. Cl. 180—716 19 Claims



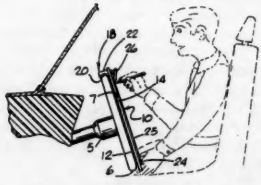
1. A trailing arm modular axle suspension unit comprising a hanger for attachment to a vehicle frame, fore and aft and central portions on said hanger, a trailing arm, fore and aft and central portions on said trailing arm, means for pivotally mounting said fore portion of said trailing arm on said fore portion of said hanger, means for mounting an axle on said aft portion of said trailing arm, shock absorber means between said aft portion of said trailing arm and said aft portion of said hanger, and spring means between said central portion of said hanger and said central portion of said trailing arm, said hanger including spaced sides, and said central portion of said trailing arm being located between said spaced sides, and said trailing arm including opposite sides, and said spring means comprising rubber springs positioned between said opposite sides of said trailing arm and said spaced sides of said hanger.

4,995,637

MOTOR VEHICLE WORK PLATFORM

Noboru Muraishi, P.O. Box 31683, Aurora, Colo. 80041

Filed Dec. 20, 1989, Ser. No. 453,788
Int. Cl.[5] B60P *1/43*
U.S. Cl. 280—727 16 Claims



1. A work platform for mounting on a steering wheel of a motor vehicle wherein the steering wheel has a rounded outer edge and a support surface which generally faces a driver of the moor vehicle, said work platform comprising:

a generally rigid base having a flat underside a top side defining a generally flat writing surface and an edge connecting said underside and said top side; and

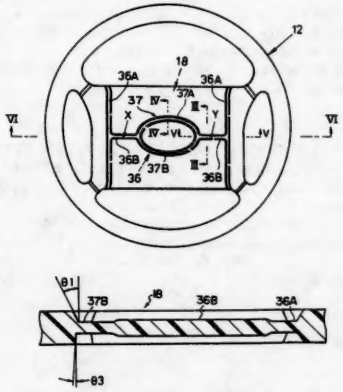
securing means for engaging the rounded outer edge of the steering wheel to mount said work platform on said steering wheel, said securing means including a single elongated member projecting outwardly from said underside adjacent said edge of said work platform, said securing means securing said work platform to the steering wheel when said flat underside of said work platform is located against the support surface of the steering wheel with said elongated member located against the rounded outer edge of the steering wheel at the top of the steering wheel.

4,995,638

AIR BAG COVER

Hiroaki Shinto, Toyota; Sumio Sakaguchi, Nagoya, and Katuki Asagiri, Niwa, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota and Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho, Niwa, both of, Japan

Filed Dec. 29, 1989, Ser. No. 459,272
Claims priority, application Japan, Dec. 29, 1988, 63-170792[U]
Int. Cl.[5] B60R *21/16*
U.S. Cl. 280—731 20 Claims



1. An air bag cover which is used for an air bag apparatus having a bag adapted to be inflated in front of a seat occupant at a sudden deceleration of the vehicle speed and which covers said bag in a folded state, said air bag cover comprising:

a cover body having a predetermined thickness for covering said bag in the folded state;

a first thin-walled portion which is provided in a portion of said cover body and is adapted to break at the time of the expansion of said bag so as to permit said bag to expand toward the seat occupant;

a second thin-walled portion which is formed continuously with said first thin-walled portion and whose longitudinal direction differs from that of said first thin-walled portion; and

a third thin-walled portion provided in a portion connecting together said first and second thin-walled portions and having a smaller thickness than those of said first and second thin-walled portions.

4,995,639

VEHICLE CRUSH ZONE CRASH SENSOR

David S. Breed, Boonton Township, Morris County, N.J., assignor to Automotive Technologies International, Inc., Boonton Township, Morris County, N.J.

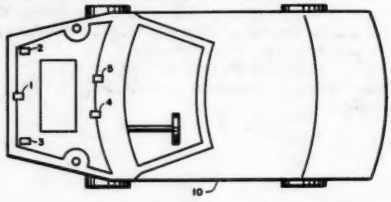
Filed Sep. 2, 1988, Ser. No. 241,538
Int. Cl.[5] B60R *21/32*
U.S. Cl. 280—735 21 Claims

1. In a motor vehicle having a forward extremity, a crush zone immediately rearward of said forward extremity, a crash sensor arranged in said crush zone and an occupant restraint system responsive to said crash sensor, the improvement wherein said crash sensor comprises:

means arranged at a given position in said crush zone of the

vehicle for determining when the vehicle elements in said crush zone have been deformed as far back in the vehicle as said position; and

means responsive to said determining means for actuating said occupant restraint system when a vehicle impact with a barrier causes said vehicle elements in said crush zone to deform as far back as said position;



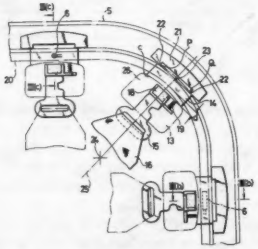
wherein said position is a sufficient longitudinal distance rearward from said forward extremity of the vehicle such that an impact by said forward extremity with a barrier at a vehicle speed below a prescribed threshold value will not actuate said occupant restraint system.

4,995,640

MAGNETIC SENSOR ACTUATION SYSTEM SUITABLE FOR USE IN PASSIVE SEAT BELT SYSTEM

Hiroyuki Saito, Chigasaki, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 12, 1990, Ser. No. 536,740
Claims priority, application Japan, Jun. 12, 1989, 1-68495[U]
Int. Cl.[5] B60R *22/06*
U.S. Cl. 280—804 15 Claims



1. In a magnetic sensor actuation system suitable for use in a passive seat belt system of the type that a slide anchor with a webbing carried thereon travels along a guide rail having at least one bent section, the improvement wherein the actuation system comprises at least one magnetic sensor provided near the guide rail and a magnet provided on the slide anchor to actuate the magnetic sensor; and upon actuation of the magnetic sensor, the magnet is located on a line extending between the center of turning movement of the slide anchor along the bent section of the guide rail and the midpoint of an area of contact between the slide anchor and the guide rail.

4,995,641

NOTE PAD FOR ENTRY INTO PERMANENT RECORDS

John C. Landry, and Michael R. Bourque, both of Farmington, Conn., assignors to Insight Media, Inc., Farmington, Conn.

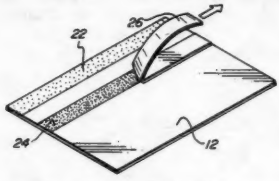
Filed Apr. 24, 1990, Ser. No. 513,838
Int. Cl.[5] B42D *15/00*
U.S. Cl. 283—67 12 Claims

1. A note pad for use with hard copy record keeping systems comprising:

(a) a multiplicity of stacked flexible sheets each having a top surface for receiving writings;

(b) a first stripe of a first adhesive on the bottom surface of each of said sheets extending substantially across one dimension of said sheets, said first adhesive being adapted to adhere firmly to a record keeping sheet;

(c) a second stripe of a second adhesive on the bottom surface of each of said sheets extending substantially across said one dimension of said sheets, said second



adhesive being a tacky repositionable pressure sensitive adhesive to releasably bond to a record keeping sheet; and

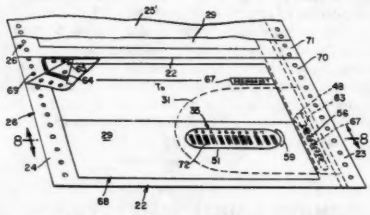
(d) binder means securing said sheets in stacked assembly and permitting removal of individual sheets therefrom, whereby said flexible sheets may be mounted temporarily by said second stripe and mounted permanently on a record keeping sheet by said first stripe.

4,995,642

POCKET LABEL FOR SHIPPING PACKAGE AND METHOD OF MAKING

Joseph J. Juszak, Crystal Lake, and John R. Poplawski, Darien, both of Ill., assignors to Wallace Computer Services, Inc., Hillside, Ill.

Filed May 8, 1989, Ser. No. 349,048
Int. Cl.[5] B42D *15/00*
U.S. Cl. 283—105 12 Claims



1. A pocket label comprising superposed, generally rectangular top, bottom and release liner plies, said bottom ply having pressure sensitive adhesive on substantially the entire surface thereof confronting said release liner ply, said release liner ply being die cut to form a generally half-elliptical segment projecting inwardly from one side edge of said release liner ply, a closed die cut line in said bottom ply lying within the periphery of said segment and providing a part removable from said bottom ply, and a closed line of perforation in said top ply generally concentric with said bottom ply closed die cut line and providing a portion removable from said top ply, said bottom ply part and said top ply portion being adhesively united whereby said top ply portion and bottom ply part are detachable from said segment as a unit, and identification indicia on said top ply portion.

4,995,643

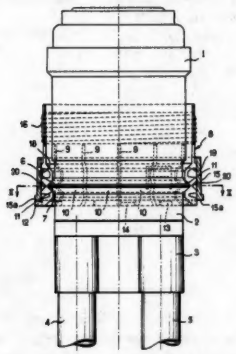
DEVICE FOR FIXING A WATER METER ON TO A BASE AND METHOD RELATING THERETO

Alain Rappart, Lalbenque; Henri Loosdregt, Paris; Paul Pershon, Prechac, and Philippe Persohn, Bazas, all of France, assignors to Manufacture d'Appareillage Electriquie de Cahors, Cahors; Lyonnaise des Eaux, Paris and Persohn S.A., Bazas, all of, France

Filed Sep. 14, 1989, Ser. No. 407,439
Claims priority, application France, Sep. 16, 1988, 88 12095
Int. Cl.[5] F16L *35/00*
U.S. Cl. 285—4 12 Claims

1. A device for fixing a water meter (1) onto the base (2) of a meter support (3) comprising a water inlet duct (4) and a water outlet duct (5), wherein the contact surfaces of the water

meter (1) and the base (2) are each bordered by an annular shoulder (6, 7) forming, when they are in contact, an annular projection, wherein an assembly ring (8) engaged around the meter and the base is provided in order to keep the two annular shoulders (6, 7) in contact with each other, this ring (8) comprising slits (9) extending over a part of its length and separating from each other a series of elastic fingers (10) distributed around the ring, this ring (8) comprising moreover on its inner face an annular groove (11) complementing the two annular shoulders (6, 7) in contact with each other, this groove (11) being formed in the part of the ring having the elastic fingers (10), the end of this part of the ring comprising lugs (12, 13, 14)



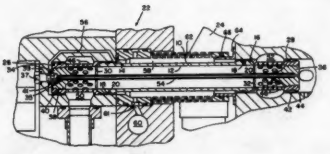
projecting radially outwards and wherein a rigid collar (15) force-fitted onto the part of the ring having the elastic fingers (10) and bearing against the lugs (12) keeps the annular groove (11) formed on the inner face of these fingers (10) against the annular shoulders (6, 7) of the meter (1) and the base (2) which are in contact, and wherein the assembly ring (8) comprises in its non-slitted part opposite the lugs (12, 13, 14) a threaded zone (16) onto which can be threaded a sleeve (17) for retaining the collar (15) on the assembly ring (8) and for pushing the latter towards the lugs (12, 13, 14).

4,995,644

LOAD BALANCED COOLANT FITTING

Donald G. Brown, Newbury Park, and Gary T. Miyata, Simi Valley, both of Calif., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 28, 1989, Ser. No. 401,193
Int. Cl.[5] F16L *53/00*
U.S. Cl. 285—41 **6 Claims**



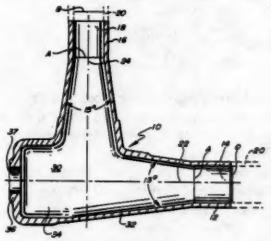
1. A coolant fitting for sealing between two structures comprising an elongated cylindrical member having a passage therethrough with sealing means for sealing at peripheral edges of part spherical circumferential surfaces at opposite ends, cylindrical inlet and outlet members mounted at opposite ends of the elongated cylindrical member and having surfaces that engage the part spherical surfaces of the elongated cylindrical member, and means securing the inlet and outlet members in engaging relationship to said part spherical surfaces of said elongated cylindrical member, and said inlet member having a plurality of circumferentially arranged radial inlet ports therethrough for providing an inlet to the passage of the elongated cylindrical member, and said outlet member having a plurality of circumferentially arranged radial outlet ports therethrough that communicate with the passage of the elongated cylindrical member for allowing fluid to exit there from.

4,995,645

ELBOW CONNECTION FOR PNEUMATIC CONVEYING SYSTEM

Josef Pausch, Hopkins, Minn., assignor to General Resource Corporation, Hopkins, Minn.

Filed Feb. 20, 1990, Ser. No. 481,596
Int. Cl.[5] F16L *45/00*
U.S. Cl. 285—127 **2 Claims**



1. An elbow for changing the direction of flow of material conveyed in conduits in a fluidic or pneumatic material handling conveyor, said elbow comprising:

(a) cylindrical inlet and outlet pipes each having a first end for connection to a conveyor conduit and a second interior end, and each having a continuous cylindrical wall defining an inlet opening in said inlet pipe and an outlet opening in said outlet pipe, said openings having a specific cross-section area;

(b) a generally frusto-conical inlet section and outlet section, each having a narrow end and a wider end, and a continuous frusto-conical wall therebetween, wherein said wall diverges to a region of maximum expansion at said wider end, the small end being continuous with said second interior end of the inlet and outlet pipes; and

(c) a chamber formed at the intersection of the respective wider ends of said frusto-conical inlet section and outlet section, said chamber having a cylindrical extension open to and in communication with said openings and axially aligned with said inlet opening and having an end wall projecting beyond the wider end of said outlet section, the cross-sectional area of said cylindrical extension being between 1.5 and 10 times the cross-sectional area of said inlet opening.

4,995,646

CONNECTOR FOR MULTIPLE LINES

Lonnie E. Johnston, Bedford, Ohio, and Peter C. Homan, Jupiter, Fla., assignors to Crawford Fitting Company, Solon, Ohio

Filed Nov. 28, 1989, Ser. No. 441,991
Int. Cl.[5] F16L *39/00*
U.S. Cl. 285—137.1 **11 Claims**

11. A connector assembly for permitting sealed passage of tubular members through a wall comprising:

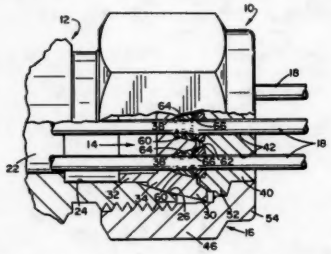
a first fitting body adapted for connection to said wall and having a passage therethrough with an outwardly open circular mouth;

a first rigid disk member received in said mouth and including a circumferentially continuous surface for sealing with said mouth when driven toward said passage, a plurality of openings formed through said first rigid disk member

for permitting free access of said tubular members through said disk and into said passage;

each said opening formed through said first rigid disk member including a conical chamber formed at the entrance thereto;

ferrule means in each conical chamber for producing a seal



between said first rigid disk member and the tubular member passing through its respective conical chamber when each respective ferrule means is driven into its respective conical chamber; and

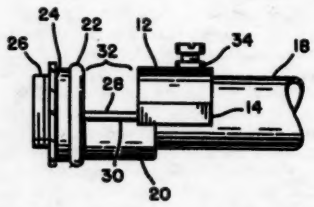
clamping means for driving said ferrule means into said conical chambers and driving said first rigid disk into said outwardly open circular mouth.

4,995,647

PORTAL SEMICYLINDRICAL ELECTRICAL CONNECTOR

Kevin Carey, Philadelphia, N.Y., assignor to John Mr. & Mrs. Carey, West Stockholm, N.Y.

Filed Jul. 26, 1989, Ser. No. 384,980
Int. Cl.[5] F16L *3/04*
U.S. Cl. 285—161 **3 Claims**



1. An electrical cover connector for securing a pipe to an electrical box comprising:

a unitary one piece main cylindrical frame having at one end an externally threaded cylinder for screw like insertion into the electrical box, about the base of said externally threaded cylinder and unitary therewith is a flange ring, the exterior of which extends above the externally threaded cylinder and serves as a backstop for the main frame when said frame is secured into the electrical box, the flange having an interior ring of similar thickness to the pipe such that said pipe will abut the interior ring preventing entry of the pipe into the externally threaded cylinder and forming a relatively smooth inner wall between and along the pipe and the interior flange ring, extending back from the flange ring and integral therewith is a semicylindrical half sleeve for receiving the pipe which will lie in the half sleeve and may abut the interior ring, said half sleeve of the main frame having means for receiving a detachable semicylindrical half sleeve;

a detachable semicylindrical half sleeve removably securable to said main frame semi-cylindrical half sleeve for enclosing the pipe within said half sleeves, the exterior of the flange also serving as a backstop to prevent forward movement of the detachable half sleeve toward the externally threaded cylinder, said detachable half sleeve being removable from the main frame without detaching said externally threaded cylinder from the electrical box for inspection of the connection without replacement of the pipe or reconnection of the main frame; and

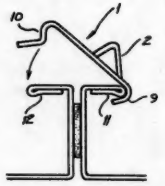
means for securing the half sleeves together and means for securing the pipe within said half sleeves.

4,995,648

LOCKING FLANGE CLIP

Roy J. Jackson, Mona Vale, Australia, assignor to Bullock Mfg. Pty. Ltd, Rydalmere, Australia

Filed Aug. 29, 1989, Ser. No. 400,090
Int. Cl.[5] F16L *23/00*
U.S. Cl. 285—406 **12 Claims**



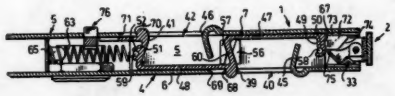
1. A locking clip for air conditioning ducting wherein the ducting is of a type which has flanges protruding outwardly and generally at right angles from the ends of the ducting; said flanges adapted to substantially abut adjacent flanges of abutting like ducting; said locking clip comprising an elongate structure comprising a central spine adapted to be positioned over the edges of said flanges and having side ribs adapted to shroud and frictionally bind the outer faces of abutting, adjacent flanges; said central spine further including at least one downwardly extending central rib portion which is forcibly insertable between the inside, abutting faces of said adjacent, abutting flanges so as to frictionally engage therewith when said locking clip binds together said adjacent, abutting ones of said flanges.

4,995,649

LOCKING DEVICE FOR SLIDING PANELS

Claes Magnusson, Vanadisvägen 43, S-113 23 Stockholm, Sweden

Continuation of Ser. No. 309,291, Feb. 13, 1989, abandoned.
This application Mar. 19, 1990, Ser. No. 496,160
Int. Cl.[5] E05C *1/10*
U.S. Cl. 292—175 **9 Claims**



1. A locking device for a sliding panel comprising:

a lock assembly received in a housing adapted to be mounted in a recess in an edge of the sliding panel for contact with a closure member, and

a latch member adapted to be mounted in said closure member; said lock assembly including:

a lock bolt having a first end and a second end and being slidable within said housing and biassed by spring means in a first direction towards said closure member, and

abutment means fixed in said housing and having a first cam surface and a second cam surface,

said first end of said lock bolt and said abutment means defining a space therebetween;

said latch member including first and second cam surfaces and being pivotedly mounted so as to be resiliently urged from an inoperative first position towards an operative second position;

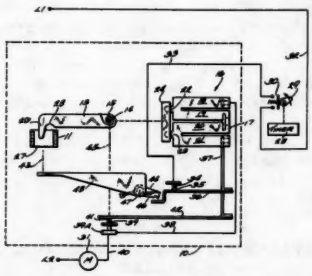
wherein sliding said panel towards a closed position against said closure member causes said first cam surface of said abutment means to initially slidably engage said first cam surface of said latch member to move said latch member to said first position, said latch member in said first position abutting said first end of said lock bolt to force said latch member in a second direction opposite to said first direction, thereby giving said latch member access to said space and enabling said latch member to pivot towards its operative position, said second cam surface of said latch member sliding against said second cam surface of said abutment means, said latch member in the operative position within said space releasing said lock bolt to be spring biassed in said first direction to positively prevent pivoting of said latch member towards the first position, thereby retaining said second cam surface of said latch member in engagement with said second cam surface of said abutment means.

4,995,650

BIMETAL OPERATED LID SWITCH AND LOCK FOR APPLIANCES

Spencer Schantz, Dousman; Ronald J. Janz, Milwaukee; Gary Christiansen, Wauwatosa, and Steven Sager, Greendale, all of Wis., assignors to U.S. Controls Corp., New Berlin, Wis.

Filed Feb. 28, 1989, Ser. No. 316,859
Int. Cl.[5] F05B *17/22*
U.S. Cl. 292—201 **17 Claims**



1. A device for locking the closure lid of an appliance such as a washing means in which there is a moving part and an electric motor for driving said part; said device comprising:

a nonconductive base,

a bimetal element having prongs extending from one end and means for supporting said element at its opposite end in cantilever fashion on said base,

a control switch closable to initiate a closure locking condition and to enable said motor to run, said switch mounted on said base and connected in a series circuit with said bimetal element and said motor so that when said switch is closed electric current conducted through said element heats it and causes said element to deflect in one direction,

a pivotally mounted control lever biased to pivot in one direction and pivotable in an opposite direction in response to closing of said closure so as to close said control switch and heat said bimetal element,

actuator means including a shaft means and bearing means supporting said shaft means for rotation about its axis relative to said base,

arm means extending generally radially from said shaft means and having slot means in which said prongs on said bimetal engage,

a lock lever mounted to said shaft means such that the shaft means or said lever has free-play to rotate through a limited angle relative to the other before one begins to drive the other rotationally,

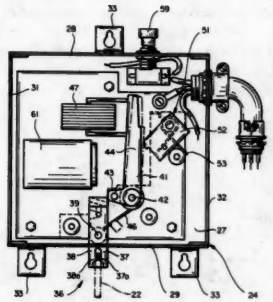
a torsion spring having opposite ends connected to said shaft means and lock lever for holding said lock lever in a predetermined angular position while said bimetal is too cool to deflect, deflection of said bimetal in one direction because of said bimetal heating due to flow of said electric current causing said shaft to rotate and transmit driving force by way of said spring to said lock lever for engaging said lock lever with said closure, further deflection of said bimetal allowing further rotation of said shaft until said free-play is taken up even if rotation of said lock lever is obstructed.

4,995,651

RELEASE MECHANISM AND METHOD

Russell Wardlaw, San Rafael, Calif., assignor to The Cookson Company, San Francisco, Calif.

Filed Dec. 1, 1989, Ser. No. 444,820
Int. Cl.[5] E05B *47/00*
U.S. Cl. 292—201 **7 Claims**



1. In a release mechanism: a retaining member, electrically operated means for holding the retaining member in a holding position when energized and for releasing the retaining member from the holding position when deenergized, a source for supplying an energizing current to the electrically operated means, and means connected to the source and to the electrically operated means for storing a limited amount of energy from the source and delivering an energizing current to the electrically operated means for a limited period of time after interruption of the current from the source.

4,995,652

DOOR LATCH

Frank A. Mugnolo, 10616 Newbury, Westchester, Ill. 60153; Anthony Mugnolo, and Joseph A. Calabrese, both of Westchester, Ill., assignors to Frank A. Mugnolo, Westchester, Ill.

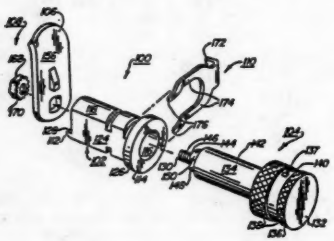
Continuation of Ser. No. 20,567, Mar. 2, 1987, Pat. No. 4,880,262. This application Aug. 18, 1989, Ser. No. 395,748
Int. Cl.[5] E05C *3/14*
U.S. Cl. 292—202 **6 Claims**

1. A latch for securing a pivoting door, which door defines a door orifice, to a door frame in a door closed position comprising:

a latch bushing which has the general shape of a hollow flanged body having a bushing longitudinal inner end, a bushing longitudinal outer end, a bushing interior surface, and a bushing exterior surface, said bushing including a flange adjacent the bushing outer end which has a cross-sectional area which extends beyond the cross-sectional area of the door orifice, the bushing exterior surface extending longitudinally towards the bushing inner end defining a first longitudinally transverse groove longitudinally disposed towards the bushing inner end from the

flange and a stop flat extending longitudinally towards the inner end, and the interior surface extending longitudinally between the inner end and the outer end being a journal defined by a smooth cylinder wall;

an operator which has the general shape of a stepped body having an operator longitudinal inner end, an operator longitudinal outer end, and an operator exterior surface partially received within said bushing, said operator including a handle adjacent the operator longitudinal outer end which has a cross-sectional area which extends beyond the cross-section area of the interior surface at the axial outer end of said bushing, the handle including a manipulatable portion adapted to be grasped by fingers being a cylinder which includes a knurled portion of the operator exterior surface to assist rotation of the operator and includes a reduced diameter means for assisting longitudinal movement of said latch to pivot the door, said reduced diameter means bearing an indicia on said operator exterior surface which may be viewed to determine the rotational position of the striker, said operator further including an attachment at the operator inner end and a bearing disposed between the handle and the attachment, the attachment having a connector portion at the operator inner end and at least one latch flat disposed between the connector portion and the bearing, the bearing having a smooth cylindrical surface, the attachment having a cross-sectional area which is less than the minimum cross-sectional area of the interior surface of said bushing and the bearing diameter being slightly less than the diameter of the journal portion of said bushing to allow relative rotation between the bearing and the journal;



a striker, received on said operator, which is a generally elongate and flat body having a proximal end, a distal end, and a striker outer surface of said striker facing the operator axial outer end, said striker defining near the proximal end an attachment orifice having at least one striker flat which is conformal with the latch flat of the attachment of said operator upon which said striker is disposed, a stop adjacent the attachment orifice protruding from the striker outer surface towards the longitudinal outer end of said operator adapted to interfere with said stop flat of said bushing and limit the relative rotation between the journal portion of said bushing and the bearing of said operator, the distal end of said striker extending far enough from the attachment orifice to be brought to bear against the door frame;

connector means adapted to interlock with the connector portion of said operator to secure said striker to said operator by preventing longitudinal movement of said striker on said operator and to bring the striker outer surface against the inner end of said bushing; and

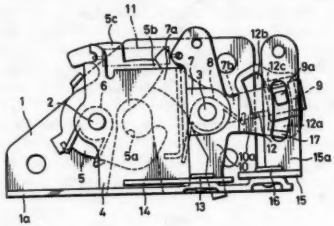
securement means bearing against the door adapted to be partially received within the longitudinally transverse groove of said bushing to restrain movement of said bushing in a direction towards the outer end of said bushing.

4,995,653

DOOR LOCK APPARATUS

Nozomu Torii, Hekinan, Japan, assignor to Aisin Seiki Kabushiki Kaisha and Aisin Hoyo Kabushiki Kaisha, both of Aichi, Japan

Filed Mar. 22, 1990, Ser. No. 497,189
Claims priority, application Japan, Mar. 24, 1989, 1-33858
Int. Cl.[5] E05C 3/26
U.S. Cl. 292—216 **2 Claims**



1. A door lock apparatus, comprising:

a base;

a latch pivotally mounted on said base;

a pawl pivotally supported on a pivot shaft, said pivot shaft being mounted to said base; said pawl being engageable with said latch for limiting rotation of the latch;

a release bush slidably mounted on said pawl, said release bush having a projection;

an opening lever pivotally mounted on said pivot shaft, said opening lever having an elongate slot for receiving the projection of the release bush to transmit rotating motion of said opening lever to said pawl for rotating the pawl out of engagement with said latch; and

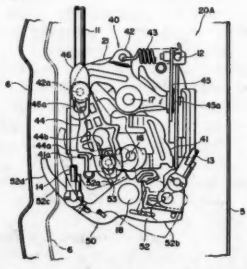
a locking lever, having an arcuate opening with a radius or the arc aligned with said pivot shaft, said release bush projection extending into said arcuate opening for transmitting a turning motion of said locking lever to said release bush, said release bush being slidable upon rotation of said locking lever for disengaging said release bush from said opening lever.

4,995,654

DOOR LOCK APPARTAUS FOR AUTOMOTIVE VEHICLE

Takashi Nishigami, and Michio Kado, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Oct. 11, 1989, Ser. No. 420,091
Claims priority, application Japan, Oct. 11, 1988, 63-255310
Int. Cl.[5] F16L 3/06
U.S. Cl. 292—216 **5 Claims**



1. An automotive vehicle door lock apparatus which is mounted on a base plate disposed between inner and outer door panels of a door of an automotive vehicle for automati-

cally latching said door when said door is closed, unlatching said door by at least an interior door handle operationally coupled to said door lock apparatus by means of a cable extending in a space formed between said inner and outer door panels so as to allow said door to be opened and locking said door by a door lock member operationally coupled to said door lock apparatus by means of a cable so as to prevent said door from being unlatched, said door lock apparatus comprising:

a door latch means comprising a latch pivotally mounted on said base plate which is engaged and turned by a striker secured to a body of said automotive vehicle so as to retain said striker when said door is closed and a detent means pivotally mounted on said base plate which is in cooperation with said latch to hold said latch when said latch is turned to retain said striker, thereby automatically latching said door;

a door unlatch means comprising an unlatching rocker arm pivotally mounted on said base plate and operationally coupled to said interior door handle by said cable and a link pivotally mounted on said unlatching rocker arm at one end thereof by means of a first connecting pin, said unlatching rocker arm being swung by at least said interior door handle to bring said link into engagement with said detent means so as to cause said detent means to release said latch, thereby releasing said striker and unlatching said door;

a door lock means comprising a locking rocker arm pivotally mounted on said base plate and slidably connecting the other end of said link thereto by means of a second connecting pin, said locking rocker arm being swung by said door lock member operationally coupled thereto by means of a cable to swing said link about said first connecting pin so as to disconnect said link from said detent means, thereby locking said door; and

a disconnecting means, cooperating with said one end of said link and extending laterally toward said outer door panel and being moved laterally inward by said outer door panel as a result of crushing of said outer door panel to swing said link about said second connecting pin so as to operationally disconnect said link from said detent means, thereby preventing said door from being opened, and formed as an integral extension of said link formed with a breakable retainer tab for partly and loosely encircling said first connecting pin so as to connect said link to said first connecting pin, said breakable retainer tab being broken by a slightly high shearing force imparted laterally thereto from said first connecting pin when said link is moved laterally inward by said outer door panel as a result of crushing of said outer door panel through said integral extension, thereby allowing said link to swing about said second connecting pin.

4,995,655

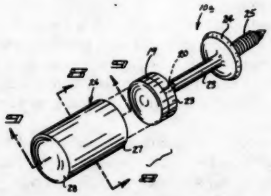
MAGNETIC DOOR STOP

Richard A. Freeman, P.O. Box 102, Climax, N.C. 27233

Filed May 7, 1990, Ser. No. 519,812

Int. Cl.[5] E05C *19/16*

U.S. Cl. 292—251.5 **3 Claims**



1. A magnetic door stop apparatus to permit selective securement of a pivotal door relative to a vertical wall, wherein the apparatus comprises,

a base member securable to the wall including an extension rod coaxially and integrally mounted to the base member extending orthogonally thereof, including a bumper means which includes a permanent magnet, and

a magnetically attractive plate member selectively mounted to the door in coaxial alignment with the bumper means to effect attraction of the bumper means to the plate member, and

selectively secure the door in a spaced relationship relative to the wall, and

wherein the plate member includes a cylindrical head defined by a predetermined diameter, and a first threaded shank coaxially and integrally mounted to a rear surface of the cylindrical head extending rearwardly of the cylindrical head for securement to the door, and

wherein the bumper means includes a resilient cylindrical bumper integrally and orthogonally mounted to the extension rod, wherein the resilient bumper is of a diameter equal to the predetermined diameter, and the base member includes a second threaded shank integrally and coaxially aligned with the extension rod extending rearwardly of the base member for securement within the wall, and

wherein the bumper means further includes a magnetic cylindrical head, the magnetic cylindrical head defined by a magnetic cylindrical head diameter equal to the predetermined diameter and includes a third threaded shank orthogonally and coxially mounted to the magnetic cylindrical head extending rearwardly thereof and threadedly received within the resilient bumper coaxially aligned with the extension rod, and the resilient bumper in contiguous coaxially aligned relationship to the magnetic head, and

wherein the bumper means further includes a cylindrical sleeve defined by a cylindrical skirt including an internal cylindrical cavity therewithin, wherein the internal cylindrical cavity includes cavity diameter equal to the predetermined diameter, and the cylindrical sleeve includes a cylindrical head member mounted to a forward end of the sleeve, and a cylindrical web mounted interiorly of the cylindrical cavity spaced from the head defining a magnet cavity between the web and the cylindrical head, and a magnet member mounted within the magnet cavity.

4,995,656

SECURITY SEALING MECHANISM

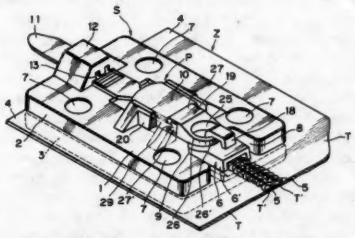
Shunji Akashi, Kurobe, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Filed Nov. 27, 1989, Ser. No. 441,635

Claims priority, application Japan, Dec. 2, 1988, 63-157410; May 16, 1989, 1-56084; Jun. 22, 1989, 1-73400

Int. Cl.[5] E05B *67/38*

U.S. Cl. 292—307 R **14 Claims**



1. In a slide fastener comprising a pair of fastener stringers each including a fastener tape and a coupling element row mounted along the inner longitudinal edge thereof and a slider mounted reciprocatively on the coupling element rows, the slider including a slider body having an attachment lug

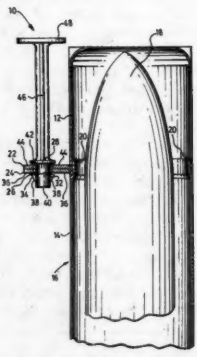
mounted on the upper surface thereof and a link pivotally connected with the attachment lug; a security sealing mechanism comprising a sealing body mounted on that end of coupling element rows to which the slider comes for closing the slide fastener and including an abutting surface disposed at the end thereof contiguous to the coupling element rows for receiving the slider and locking means provided on the upper surface of the sealing body, and a pull tab having one end releasably jointed to the link and having the other end adapted for unreleasable locking engagement with the locking means.

4,995,657

FASTENER FOR SECURING THE CLOSURE OF A CONTAINER

Grant D. Farrell, and Edward Goles, both of Pickering, Canada, assignors to Scepter Manufacturing Company Limited, Toronto, Canada

Filed Jan. 23, 1989, Ser. No. 299,435
Int. Cl.[5] E05B *39/02*
U.S. Cl. 292—327 **16 Claims**



1. A fastener for securing a closure to a container, in which the closure has a first ring means and the container has a second ring means, such that when the closure and the container are fully engaged, the first and second ring means are coaxially aligned, thereby providing a bore through both the first and second ring means, the fastener comprising:

(a) a body having a longitudinal axis;

(b) the body having first projection means dimensioned such that the body can be inserted through the bore in a first direction along its longitudinal axis but is prevented from moving in a second direction, being 180° to the first direction, by abutting the surface surrounding the bore;

(c) the body having second projection means located at a distance in the second direction from the first projection means, that prevents the body from moving in the first direction by abutting the surface surrounding the bore;

(d) at least one of the projection means is capable of being detached from the fastener by tearing away from the body during removal of the fastener from the container by movement in either the first or second direction;

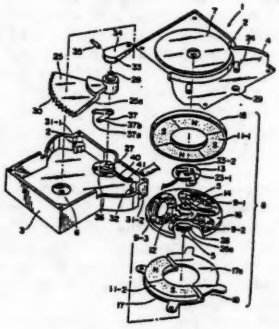
(e) the body comprising a core section surrounded by an outer section to which is attached the first projection means such that during removal of the fastener in a second direction, the outer section is held fast against the surface surrounding the bore by means of the first projection means and the core moves relative to the outer section.

4,995,658

DOOR LOCKING DEVICES

Manabu Shiraki, Yamato, and Osamu Hamaguchi, Nirasaki, both of Japan, assignors to Sicoh Engineering Co., Ltd., Tokyo, Japan

Filed Jul. 30, 1990, Ser. No. 559,093
Claims priority, application Japan, Aug. 4, 1989, 64-201200
Int. Cl.[5] E05B *47/00*
U.S. Cl. 292—336.3 **3 Claims**



1. A door locking device characterized in that:

first and second field magnets are disposed at respective stationary positions opposite to each other through an axial air gap to provide stators;

the first field magnet has 2P contiguous poles of alternating N and S polarity, wherein P is an integer of at least 2, and is formed in a torus shape;

the second field magnet has n pole(s) each of contiguous and alternating N and S magnetic poles, wherein n is an integer of at least 1 provided that 2P is greater than n, and is formed so as to define a space capable of receiving a swingable driven gear in the plane opposite to a rotatable coreless armature and hence not to become a complete torus form;

an m-phase rotatable coreless armature, wherein m is the number of phases and is an integer of at least 2, composed of k armature coils, wherein k is an integer of at least 2, is rotatably provided between the first field magnet and the second field magnet;

a commutator is provided on the rotatable coreless armature so as to rotate integrally therewith;

brushes coming into movable contact with the commutator are provided on its corresponding stationary side;

a driving gear rotating integrally with the rotatable coreless armature is disposed concentrically with the armature;

a back yoke for the second field magnet is extended and bent so as to face the rotatable coreless armature at the position of the space defined with respect to the second field magnet through a slight air gap to define a swingable driven gear-receiving space on the lower side of the extended and bent portion;

the swingable driven gear, which is fixed to an output gear shaft supported rotatably and provided swingably by a predetermined angle, is engaged with the driving gear in an interlocking relation so that it may be received and disposed in the swingable driven gear-receiving space; and

an output lever transmitting a mechanical output on the locking/unlocking side of a door is rotatably attached to the output gear shaft, to which the swingable driven gear has been fixed.

4,995,659

SHOCK ABSORBER FOR A CAR

Heung Jong Park, 410-4 Beon 1-Dong, Dobong-ku, Seoul, Rep. of Korea (132-061)

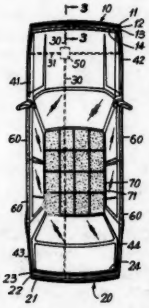
PCT No. PCT/KR88/00021, § 371 Date Jun. 8, 1989, § 102(e) Date Jun. 8, 1989, PCT Pub. No. WO89/03328, PCT Pub. Date Apr. 20, 1989

PCT Filed Oct. 15, 1988, Ser. No. 372,341

Claims priority, application Rep. of Korea, Oct. 15, 1987, 17572/1987

Int. Cl.[5] B60R *19/00*

U.S. Cl. 293—107 3 Claims



1. A shock absorber for a car comprising front and rear bumpers, said front and rear bumpers each comprising a bumper member for low pressure shock absorption, medium pressure shock absorption and high pressure shock absorption, each of said bumper members being filled with a gas of predetermined pressure, each of said low, medium, and high pressure shock absorption members of different thickness and gas capacity; an air sheet filled with a gas and conforming to the shape of and mounted to the front and rear left and right side panels of the car, ; an air sheet filled with a gas and conforming to the shape of and mounted to the doors of the car; an air sheet filled with a gas, conforming to the shape of a roof of the car and mounted thereto, a longitudinal gas circulatin tube mounted longitudinally with the body of the car and which interconnect the front bumper members, for medium and high pressure shock absorption with the rear bumper members, for medium and high pressure shock absorption so that the gases of the interior thereof can be circulated; a lateral gas circulation tube mounted laterally within the body of the car so as to intersect said longitudinal gas circulation tube and which interconnects the air sheets for the left and right front side panels so that the gas or the interior thereof can be circulated; and gas circulation control means which controls the gas circulatin by being mounted at a points of intersection of said longitudinal gas circulation tube and said lateral gas circulation tube.

4,995,660

MOUNTING STRUCTURE FOR VEHICLE BUMPER ASSEMBLY

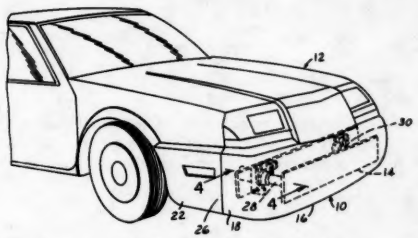
John Horansky, Troy, and Kenneth L. Winalis, Clemens, both of Mich., assignors to Chyrsler Corporation, Highland Park, Mich.

Filed Jun. 7, 1990, Ser. No. 535,001

Int. Cl.[5] B60R *19/26*

U.S. Cl. 293—132 7 Claims

1. In a vehicle bumper assembly comprising a bumper structure for receiving impact forces, at least one energy absorbing device secured between the bumper structure and vehicle support structure to mount said bumper structure, the energy absorbing device including a cylinder detachably fastened to said vehicle support structure, a piston slidably received within the cylinder, the piston being detachably fastened at an outer end thereof to the bumper structure, the improvement comprising mounting structure for detachably fastening the cylinder to said vehicle support structure which compensates for variations in the orientation of the bumper structure with respect to the vehicle support structure, said mounting structure including a cylinder bracket fixedly secured to the cylinder, the cylinder bracket including at least one arm extending outwardly from the cylinder, said arm having an opening therein, a support bracket, the support bracket including a wall, the wall having a first cylinder opening therein of larger diameter than the cylinder, the vehicle support structure having a second cylinder opening therein of larger diameter than the cylinder, means detachably fastening the support bracket to the vehicle support structure with said first and second cylinder openings in substantial registry, the cylinder extending through the first and second cylinder openings at a location



and angle limited by the diameters thereof, the means for detachably fastening the support bracket to the vehicle support structure including said wall having at least one vertically oriented elongated mounting opening therein, said vehicle support structure having at least one bracket opening therein, fastening means extending through said mounting opening and bracket opening to secure the cylinder bracket in place with the mounting opening permitting vertical adjustability of the cylinder bracket, said wall having at least one arm extending outwardly therefrom, said arm having a horizontally oriented elongated mounting opening therein, fastening means extending through the mounting opening in the support bracket arm and the opening in the cylinder bracket arm to secure the cylinder to the support bracket with the mounting opening in the support bracket arm permitting horizontal adjustability of the cylinder.

4,995,661

ANIMAL FECES RETRIEVER

Harold O. Aurness, 5808 Knox Ave. N., Brooklyn Center, Minn. 55430, and Thomas G. Mahler, 3841 Unity Ave. N., Robbinsdale, Minn. 55422

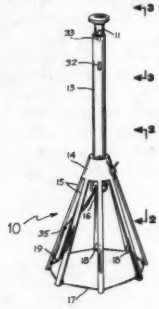
Filed Oct. 10, 1989, Ser. No. 419,506

Int. Cl.[5] A01K *29/00*

U.S. Cl. 294—1.4 8 Claims

1. A device for retrieving, or picking up, animal waste having a set of flexible spring stays extending down and outward in a circular cone shape from a sliding collar mounted on a housing tube, which tube is pulled up through the collar from within the cone of the spring stays, with cooperatinal means between the housing tube and collar to hold the housing tube in an extended, but retractable position and kept from further extension by a flanged end of the housing tube; a sliding tube within the housing tube having a handle at the top with a guide groove on the outside extending from below the handle to the bottom keeping the tube in alignement by a depression at the top of the housing tube riding in the groove when extending or retracting, to guide the sliding tube to holding means; a pull ribbon of a length determined for efficiency slideably connecting through eyelets at the bottom of all the spring stays with both ends extending up through a gathering ring at the bottom of the sliding tube within the housing tube and up to and over a cross member inside the sliding tube and back down through the gathering ring to be anchored to the outside of the sliding

collar; spring means on the gathering ring cooperating with means in the housing tube to hold the sliding tube in an extended position which holds the bottoms of the spring stays together and which action encloses the faces within a bag



removeably attached by means to the bottom of the housing tube with the open end folded up over the spring stay ends; means for holding the bottoms of the spring stays together for storage.

4,995,662

SUCTION PICK-UP APPARATUS FOR ELECTRICAL OR ELECTRONIC COMPONENTS

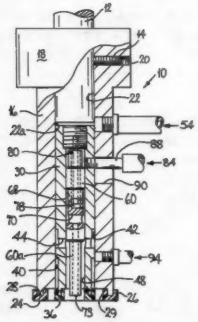
Victor T. Hawkswell, Essex, England, assignor to Emhart Industries, Inc., Hartford, Conn.

Continuation of Ser. No. 207,362, Jun. 15, 1988, Pat. No. 4,852,247. This application Jul. 7, 1989, Ser. No. 376,773

Claims priority, application United Kingdom, Jun. 17, 1987, 8714175

Int. Cl.[5] H05K *3/30*; **B25J** *15/06*; **B65G** *47/91*

U.S. Cl. 294—64.1 **3 Claims**



1. A pick-up head for picking up electronic components comprising

a body having an annular pick-up surface at the bottom thereof defining a first suction area and a vertical blind bore extending upwardly from said first suction area,

a first piston member slidably displacable within said bore between selected upper and lower positions and having top portion for sealing said bore,

a second annular pick-up surface at the bottom thereof defining a second smaller suction area and

a vertical blind bore extending upwardly from said second area,

a second piston member slidably displaceable within said first piston bore between selected upper and lower positions, and having

a top portion for sealing said bore,

a third annular pick-up surface at the bottom thereof defining a third yet smaller suction area and

a vertical blind bore extending upwardly from said third area,

conduit means extending through said body communicating with said body bore above said first piston member and

means for connecting a pressure or vacuum source to said second piston member including

an enlarged opening in said body,

pipe means passing through said enlarged opening and through said first piston member below the top portion thereof and above said second piston member,

said enlarged area having a size selected so that said first piston member carrying said pipe means can be displaced between said first piston member upper and lower positions.

4,995,663

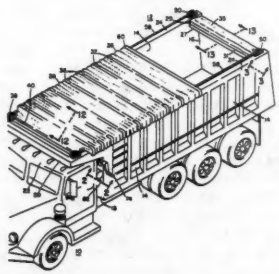
SLIDABLE TRUCK COVER ASSEMBLY

Robert C. Weaver, Rd. #1, Port Matilda, Pa. 16870, and Robert Semion, 1306 Deerfield Dr., State College, Pa. 16803, assignors to Robert C. Weaver, Port Matilda; Robert Semion, State College; John H. Imbt, State College and Marlin K. Gingrich, State College, all of, Pa.

Continuation-in-part of Ser. No. 384,650, Jul. 25, 1989, Pat. No. 4,948,193, which is a continuation-in-part of Ser. No. 139,444, Dec. 30, 1987, Pat. No. 4,858,984, which is a continuation-in-part of Ser. No. 888,001, Jul. 22, 1986, Pat. No. 4,725,090. This application Aug. 28, 1989, Ser. No. 399,264

Int. Cl.[5] B60D *7/04*

U.S. Cl. 296—100 **16 Claims**



1. A tarpaulin support apparatus for supporting a tarpaulin over a bed of a truck, comprising

a slat having a central portion that extends between a first side wall of the truck and a second side wall of the truck, a first end portion extending from one end of the central portion downwardly over and adjacent to the first side wall of the truck, and a second end portion extending from the other end of the central portion downwardly over and adjacent to the second end wall of the truck,

slat support means for supporting the slat on the side walls of the truck, and

attachment means for attaching the tarpaulin to the slat,

said attachment means including

a lateral tarpaulin support mounted on the end of each slat over the tarpaulin and extending downwardly over and adjacent to the side walls of the truck for holding the tarpaulin close to the side walls of the truck.

4,995,664

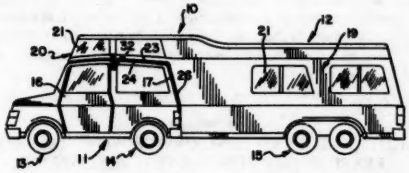
HITCH FOR MOTOR HOME ASSEMBLY

John M. Buday, Toronto, Canada, assignor to Continental Coach Ltd., Toronto, Canada

Continuation-in-part of Ser. No. 89,500, Aug. 26, 1907, Pat. No. 4,848,731. This application Jul. 12, 1989, Ser. No. 378,642

Int. Cl.[5] B60P *3/34*

U.S. Cl. 296—165 16 Claims



1. In a motor home assembly comprising a motor vehicle unit including a rear wall and having steerable front wheels and selectively steerable rear wheels, a motor home trailer unit including at least one pair of wheels and having a front wall positioned adjacent said vehicle unit rear wall, and cooperating coupling means between said vehicle unit and said trailer unit to selectively close-couple said units together as one rigid assembly in sealed relationship one with the other, said cooperating coupling means including two spaced apart and forward projecting connector guide elements adjacent each side of said trailer unit at the bottom and the top of the front wall thereof, and corresponding spaced apart connector receptacles adjacent each side of said vehicle unit at the bottom and the top of the rear wall thereof, said connector guide elements detachably engaging and locked within said connector receptacles by corresponding movable locking elements when said units are coupled in rigid assembly, the improvement which comprises:

(a.) said connector guide elements each including a locking receptacle for receiving a corresponding movable locking element for locking engagement;

(b.) each connector guide element locking receptacle comprising a conical aperture passing through said connector guide element;

(c.) each movable locking element being pivotally mounted on motive means and having a conical forward section;

(d.) each connector guide element locking conical aperture being conically sized and shaped to receive and retain the conical forward section of said corresponding movable locking element in a mated locking engagement upon activation of said motive means; and,

(e.) said motive means including actuator motive means mounted at each side of said vehicle between said top and bottom connector receptacles, and upper and lower actuator means movably connected to said actuator motive means for moving upper and lower locking elements into and out of locking engagement with corresponding connector guide element conical apertures, and means pivotally mounting said movable locking elements to the corresponding actuator means.

4,995,665

SUNROOF STRUCTURE FOR MOTOR VEHICLE

Hisao Ichinose, Atsugi; Yoshimitsu Takeda, Zama; Tsuyoshi Sato, and Hiroshi Imai, both of Tokyo, all of Japan, assignors to Nissan Motor Company, Ltd. and Johnan Seisakusho Co., Ltd., both of, Japan

Filed Feb. 26, 1990, Ser. No. 484,594

Claims priority, application Japan, Feb. 27, 1989, 1-21587[U]; Feb. 27, 1989, 1-21590[U]; Feb. 27, 1989, 1-21588

Int. Cl.[5] B60P *7/05, 7/22*

U.S. Cl. 296—213 12 Claims

1. A sunroof structure for a vehicle having an aperture formed in a roof of the vehicle, said sunroof structure comprising:

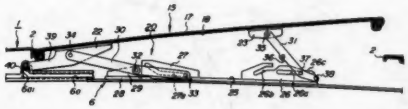
a guide rail extending along each side of said aperture;

a sunroof lid adapted to cover said aperture;

front and rear brackets secured to front and rear portions of said sunroof lid, said front bracket having a portion slidably engaged with said guide rail;

a front guide slidably engaged with said guide rail;

a rear guide device which is located behind said front guide and slidably engaged with said guide rail, said rear guide device including a front sub-guide and a rear guide which are united to move together;



a front link having a front end pivotally connected to said front bracket and a middle portion pivotally connected to said front guide;

a rear link having a front end pivotally connected to said rear bracket;

first guide means on said front sub-guide for guiding a movement of a rear end of said front link with respect to said front sub-guide;

second guide means on said rear guide for guiding a movement of a major portion of said rear link with respect to said rear guide; and

drive means for driving said rear guide device along said guide rail.

4,995,666

SUN ROOF

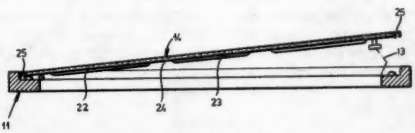
Erich Schürmann, Sendenhorst, Fed. Rep. of Germany, assignor to Gabel BmbH, Schwelm, Fed. Rep. of Germany

Filed Nov. 6, 1989, Ser. No. 433,042

Claims priority, application Fed. Rep. of Germany, Nov. 22, 1988, 3839403

Int. Cl.[5] B60J *7/08*

U.S. Cl. 296—216 11 Claims



1. An openable sun roof assembly for an automotive vehicle, comprising:

a frame formed in a roof of an automotive vehicle;

a translucent panel movably mounted in said frame, said panel having an inner surface turned toward an interior of said vehicle and having a pair of opposite edges;

a single hinge mounted on said panel at a midpoint of one of said edges and constituting a sole hinged pivoting articulation between said one edge and said frame;

a panel-closing element for retaining said panel in a closed position located on said panel at a midpoint of the other of said edges whereby said hinge and said panel-closing element lie along a surface centerline of said panel; and

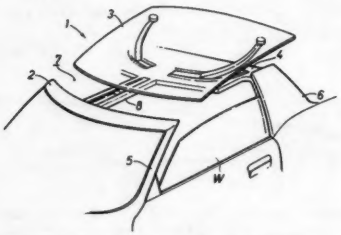
an elongated strip of material fixed to said inner surface along said centerline and formed at one end with said hinge and at an opposite end with said panel-closing element, said strip being adhesively bonded to said inner surface by a layer of an adhesive, and said strip being formed along a length thereof with zones alternating with one another and having different bending stiffnesses.

4,995,667

VEHICLE SLIDING ROOF SYSTEM

Michio Tamura, and Fumio Furuki, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 1, 1989, Ser. No. 317,323
Claims priority, application Japan, Mar. 3, 1988, 63-50375
Int. Cl.[5] B60J 7/047
U.S. Cl. 296—216 20 Claims



6. A vehicle sliding roof system, comprising:

a fixed front roof having a width;

a fixed rear roof having a width and an upper surface, and located a predetermined longitudinal distance from said fixed front roof;

a movable central roof located between said fixed front roof and said fixed rear roof and defining an area that extends substantially across the width of said fixed front and rear roofs and substantially along the longitudinal distance between said fixed front roof and said fixed rear roof;

said movable central roof being capable of selectively moving into and out of a closed position between said fixed front roof and said fixed rear roof;

a pair of first guide rails located on the upper surface of said fixed rear roof, each said first guide rail extending along one of two predetermined substantially curved paths;

a pair of guide arms each having two ends, a first end of said guide arm pivotally connected to said movable central roof;

first guide shoe means connected to a second end of each said guide arm for slidably engaging each second end of each said guide arm with one of said first guide rails, each said guide arm moving in substantially curved motion and along the pre-determined substantially curved path of said corresponding guide rail; and

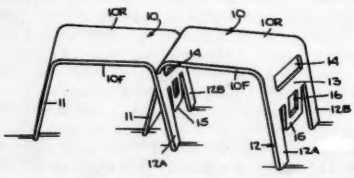
drive means for moving said second ends of said guide arms along said first guide rails.

4,995,668

MODULAR STOOL

Bashir Zivari, 266 Washington Ave., C-7, Brooklyn, N.Y. 11205

Filed Jul. 13, 1990, Ser. No. 552,161
Int. Cl.[5] A47C 1/124
U.S. Cl. 297—248 9 Claims



1. A modular stool capable of functioning in a kindergarten or similar facility as an individual seat for a child, which stool when interlinked with like stools can be used for group seating, said stool comprising:

(a) a wedge-shaped seat section whose rear end is broader than its front end;

(b) left and right side sections integral with the seat section and outwardly inclined with respect thereto, said left side section being defined by a broad leg centered with respect to said left and right ends of the seat section, said right side section being defined by left and right narrow legs joined to the front and rear ends of the seat section; and

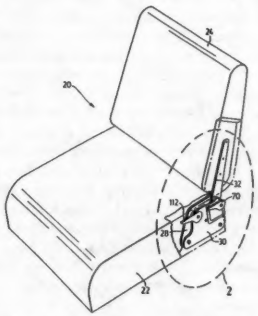
(c) a cross arm bridging the narrow legs below the seat section to define a transverse slot whose width is substantially equal to that of the broad leg, whereby two stools may be interlinked by inserting the broad leg of one into the slot of the other.

4,995,669

ADJUSTABLE LATCHING DEVICE WITH MEMORY FEATURE FOR VEHICLE SEAT ASSEMBLIES

George Croft, Oakville, Canada, assignor to Canadian A.S.E. Limited, Mississauga, Canada

Filed Dec. 20, 1989, Ser. No. 453,653
Claims priority, application Canada, Dec. 28, 1988, 587172
Int. Cl.[5] B60N 2/02
U.S. Cl. 297—379 11 Claims



1. An adjustable latching device for use with a vehicle seat assembly having a first and a second seat member pivotally foldable relative to one another about a pivot axis between folded and unfolded operative configurations, the device comprising:

a latch pin rigidly mounted on the first seat member so as to define a first concentric arc of movement upon said pivotal folding of the first seat member about said pivot axis;

an idler plate having a generally arcuate gear sector and being mounted for rotation about said pivot axis;

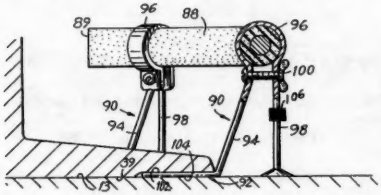
a locking arm rotatably mounted on the idler plate and having a detent portion positioned adjacent one end in spaced relation from the point of rotational movement of the arm so as to be adapted to restrainingly engage the latch pin thereby to cause rotation of the idler plate with the first seat member in at least one rotational direction upon pivotal folding of the first seat member about said pivot axis in said at least one rotational direction;

a first rotational control means for selectively rotating the locking arm into and out of said restraining engagement;

a pawl means, having a head and a tail portion, and being pivotally mounted on the second seat member intermediate said head and tail portions for pivotal movement between a first rotational position whereat said head portion lockingly engages said gear sector to prevent rotation of the idler plate and a second rotational position whereat said head portion is disengaged from said gear sector to allow for said rotation of the idler plate about said pivot axis; and,

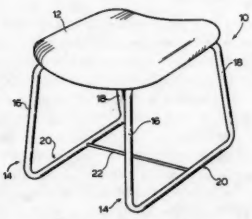
a second rotational control means for selectively rotating the pawl means between said first and said second rotational positions.

4,995,670
HAIRDRESSER FOOT REST
Wilson A. Rodas, R.D. 2 Quannacut Rd., Pine Bush, N.Y. 12566
Continuation of Ser. No. 228,892, Aug. 5, 1988, abandoned. This application Feb. 2, 1990, Ser. No. 474,291
Int. Cl.[5] A47C *7/50*
U.S. Cl. 297—423 **5 Claims**



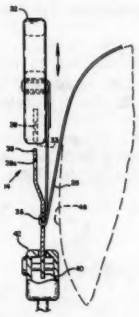
1. A portable footrest for use with a styling chain having a circular base positioned on the floor, an upstanding pedestal projecting from the base and a chair mounted to the upper end of the pedestal, said footrest comprising a circular foot support assembly means substantially encircling the pedestal and adapted to support the foot of the user but not engaging said pedestal, said foot support assembly means comprising at least one independent arcuate segment having vertical support means to provide a non-rotational vertical support and positioning of said foot support assembly means, said foot support assembly means being vertically spaced above said floor to permit the stylist-user to rest a foot thereon without movement to said support assembly; said vertical support means mounted to said foot support assembly and extending downwardly therefrom, said support means including means to removably mount said support means to said chair base, said means to removably mount including a tongue adapted to be inserted between said chair base and the floor for frictional positioning therebetween and having a vertical portion having an adjustable sleeve adapted to receive the arcuate segment, said sleeve having means to removably secure the arcuate segment thereto.

4,995,671
SEAT LEG SYSTEM WITH STABILIZER BAR
Greg Gabourie, Ajax, and Steve Fox, Keswick, both of Canada, assignors to Global Upholstery Co., Ltd., Downsview, Canada
Filed Jan. 31, 1990, Ser. No. 472,861
Claims priority, application Canada, Feb. 9, 1989, 590665
Int. Cl.[5] A47C *16/00*
U.S. Cl. 297—439 **6 Claims**



1. A chair, comprising;
(i) a seat;
(ii) two spaced leg assemblies, each leg assembly comprising two spaced legs and a crossbar extending between said spaced legs and attached at its ends to said spaced legs, the crossbar spaced down from the top ends of said legs, and means attaching said legs at said top ends to said seat;
(iii) a substantially rigid resilient pre-torqued brace having a main axis, extending between the crossbars of said leg assemblies, and having a connection at each end with a crossbar, each connection comprising a shaped end portion inclined at an angle to the main axis and a restricted, transversely extended passage in the crossbar, said shaped end extending obliquely in said passage, wedged across opposed wall portions of the passage.

4,995,672
PRISONER RESTRAINT SYSTEM
Dan E. Corcoran, 8310 SW. Greenway, No. 45, Beaverton, Oreg. 97005
Division of Ser. No. 257,997, Oct. 14, 1988, Pat. No. 4,925,246. This application May 8, 1990, Ser. No. 521,190
Int. Cl.[5] B60R *21/10*
U.S. Cl. 297—483 **8 Claims**

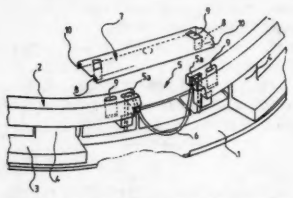


1. A belt restraint assembly comprising:
(a) a belt having a first end portion and a second end portion, said second end portion being secured to a first anchoring point;
(b) first and second mating latching means for selectively engaging each other, said first latching means operatively associated with said belt, said second latching means being secured to a second anchoring point;
(c) said first latching means including cinch means for engaging and tightening said belt;
(d) a cinch handle connected to said first end portion of said belt; and
(e) engagement means, cooperating between said cinch handle and said first latching means, for detachably engaging said cinch handle to said first latching means.

4,995,673
ORNAMENTAL WHEEL HUB CAP
Dominique DuBost, La Celle Saint Cloud, France, assignor to Rapid S.A., Paris, France
Filed Oct. 2, 1989, Ser. No. 415,664
Claims priority, application France, Oct. 24, 1988, 88 13895
Int. Cl.[5] B60B *7/06*
U.S. Cl. 301—37 P **4 Claims**

1. An ornamental wheel hub cap adapted to be removably secured into a stepped portion of a wheel rim of a vehicle through the medium of a resiliently deformable ring clipped into said stepped portion and split to form at least two free ends connected by at least one resiliently deformable means for causing said ring to be radially deformed, said one resiliently deformable means comprising a wire, wherein the improvement comprises a strap being removably mounted between the

at least two free ends and exerting a prestress upon the ring against a force exerted by said at least one resiliently deformable means thereby preventing the deformation of the hub



cap-ring assembly before mounting onto the wheel rim and also allowing the mounting of this assembly through clipping onto the rim after removal of the strap.

4,995,674

WHEEL COVER

Noboru Shirai, and Toshiyuki Isogai, both of Aichi, Japan, assignors to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan

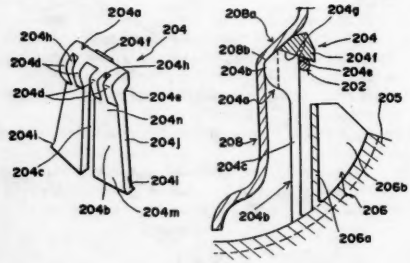
Continuation of Ser. No. 81,361, Aug. 4, 1987, Pat. No. 4,826,253. This application Jan. 18, 1989, Ser. No. 298,665

Claims priority, application Japan, Aug. 4, 1986, 61-119889; Nov. 20, 1986, 61-179581; Dec. 1, 1986, 61-185728; Dec. 1, 1986, 61-185729; Mar. 31, 1987, 62-49032

The portion of the term of this patent subsequent to May 2, 2006, has been disclaimed.

Int. Cl.[5] B60B *7/12*

U.S. Cl. 301—37 P **3 Claims**



1. A wheel cover for a motor vehicle comprising:

a synthetic-resin-made wheel cover main body having a plurality of holding claws integrally circumferentially formed on a rear surface thereof;

said holding claws being provided with an engaging portion formed on a radial outside surface of a head portion thereof;

a resilient reinforcement ring having approximately the same diameter as a diameter defined by said holding claws;

each of said plurality of holding claws having a projection integrally formed on the radial inside surface of the head portion of said claw, said projection protruding substantially inwardly in the radial direction with respect to the radial inside surface of said head portion and including a wire-ring engaging surface which engages and holds said resilient reinforcement ring;

said resilient reinforcement ring being inserted into said wire ring engaging surface, whereby the wire ring engaging surfaces of each of said holding claws, when said wheel cover is removably fitted to a wheel, are pressed to contact with a rim of the wheel by an inherent resilience of said holding claws and said resilient reinforcement ring; and

an opening radially penetrating said claw and being positioned under the projection, said opening being formed by insertion of a metal mold within the wheel cover thereby integrally forming the wire ring engaging surface when molding the wheel cover.

4,995,675

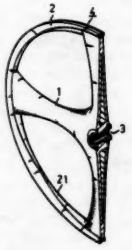
BICYCLE WHEEL AND THE MANUFACTURING METHOD

Carlos Tsai, No. 91-4, Sec. 4, Mei Chuan E. Rd., Taichung City, Taiwan

Filed Jul. 12, 1989, Ser. No. 378,830

Int. Cl.[5] B60B *5/02*

U.S. Cl. 301—63 PW **4 Claims**



1. A bicycle wheel generally comprising a rim having at least three spokes and a hub formed at a center of said wheel; an annular recess being formed on an outer peripheral surface of said rim for receiving a tire; a compartment being formed within each said spoke for containing foam material; and a rib being formed on an inner peripheral surface of said rim, said rib changing, from a substantial medium position between two adjacent spokes on both directions toward the spokes, from wider to thinner.

4,995,676

POSITIONING RING FOR A HYDRAULICALLY OPERATED WARNING DEVICE

Donald A. Crumb, Granger, Ind.; Richard A. Zander, Niles, Mich., and Robert F. Gaiser, Stevensville, Mich., assignors to Allied-Signal Inc., Morristown, N.J.

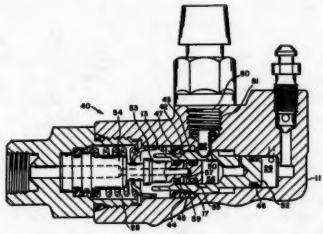
Filed Dec. 8, 1989, Ser. No. 450,359

Int. Cl.[5] B60T *13/00*

U.S. Cl. 303—9.63 **15 Claims**

1. A positioning ring for a hydraulically operated device, the hydraulically operated device comprising a housing having therein a bore communicating with an opening having therein a hydraulically responsive device, pressure movable sleeve means disposed within said bore and having a positioned sleeve portion thereat, the hydraulically responsive device including movable means responsive to the positioned sleeve portion, the sleeve means defining at one end of said bore a portion of a first pressure chamber and at the other end of the bore a portion of a second pressure chamber, the bore including a housing shoulder and the sleeve means including a sleeve shoulder, and stepped positioning ring means disposed about said sleeve means, the stepped positioning ring means engaging the sleeve shoulder and housing shoulder so that the shoulders are non-aligned relative to one another, pressure within the second

pressure chamber exerted upon the sleeve means and ring means in a direction toward the first pressure chamber so that said stepped positioning ring means engages said housing shoulder, such that one of a mis-assembly of said stepped positioning ring means and a failure to place said stepped positioning ring means about said sleeve means permits said sleeve means to be displaced toward said first pressure chamber to cause the movable means to respond to the displacement of the positioned sleeve portion.



4,995,677

HYDRAULIC BRAKING PRESSURE CONTROL SYSTEM

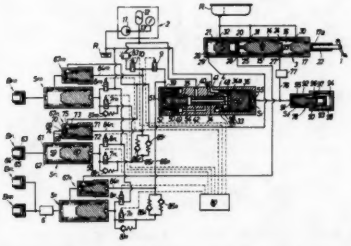
Shohei Matsuda; Jiro Suzuki; Tsuyoshi Sato, and Kazutoshi Tashima, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 12, 1990, Ser. No. 492,022

Claims priority, application Japan, Mar. 13, 1989, 1-60243; May 22, 1989, 1-128277

Int. Cl.[5] B60T *8/32*

U.S. Cl. 303—113 3 Claims



1. A hydraulic braking pressure control system comprising auxiliary hydraulic pressure generating means connected to a brake device for generating a hydraulic pressure depending upon a braking operation by a brake pedal; a hydraulic pressure supply source; hydraulic pressure supply source hydraulic pressure control means capable of controlling the hydraulic pressure from said hydraulic pressure supply source in accordance with the braking operation by said brake pedal; hydraulic pressure transmitting means which is interposed in a hydraulic pressure path extending from said hydraulic pressure supply source via said hydraulic pressure supply source hydraulic pressure control means to said brake device and which is arranged to permit the transmission of the hydraulic pressure output from said hydraulic pressure supply source hyrdraulic pressure control means to said brake device when the hydraulic pressure in said hydraulic pressure supply source is normal and to cut off the flowing of a working fluid from said brake device toward said hydraulic pressure supply source when the hydraulic pressure in said hydraulic pressure supply source is abnormally reduced; and an on-off valve interposed between said auxiliary hydraulic pressure generating means and said brake device, having a pilot chamber leading to an output port of said hydraulic pressure supply source hydraulic pressure control means, and adapted to be closed in response to an increase in the hydraulic pressure in said pilot chamber, wherein said on-off valve is closed by rising of the output hydraulic pressure from said hydraulic pressure supply source hydraulic pressure control means prior to rising of the output hydraulic pressure from said auxiliary hydraulic pressure generating means during a braking operation by said brake pedal.

4,995,678

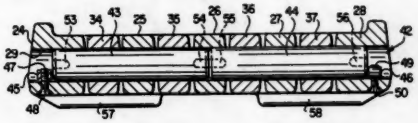
PROTECTED PIN RETENTION DEVICE FOR CRAWLER TRACK ASSEMBLY

Joseph A. Jinkens, New Albany, Ohio, assignor to Matsuhita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 20, 1988, Ser. No. 287,078

Int. Cl.[5] B62D *55/205*

U.S. Cl. 305—58 R 11 Claims



1. A crawler pad assembly comprising first and second crawler pads;

each of said crawler pads having a leading edge portion and a trailing edge portion, the leading edge portion of each crawler pad having a plurality of spaced apart first hinge knuckles extending parallel to each other, each of said first hinge knuckles having a first bore extending therethrough, the first bores of a respective crawler pad being at least substantially cylindrical and coaxially aligned with respect to each other;

the trailing edge portion of each crawler pad having a plurality of spaced apart second hinge knuckles extending parallel to each other, each of said second hinge knuckles having a second bore extending therethrough, the second bores of a respective crawler pad being at least substantially cylindrical and coaxially aligned with respect to each other, the plurality of spaced apart first hinge knuckles on a respective crawler pad extending parallel to and offset from the plurality of spaced apart second hinge knuckles on the same crawler pad;

the plurality of spaced apart first hinge knuckles of said first crawler pad being engaged in alternating relationship with the plurality of spaced apart second hinge knuckles of said second crawler pad, with the first bores of said first crawler pad being coaxially aligned with the second bores of said second crawler pad to form a substantially cylindrical chamber extending through the thus engaged first and second hinge knuckles;

at least one substantially cylindrical hinge pin positioned in said substantially cylindrical chamber to thereby pivotally connect said first and second crawler pads;

first and second retention elements positioned in said substantially cylindrical chamber such that each said retention element is completely encircled by a hinge knuckle to protect the respective retention element against abrasive contact with the ground during movement of the crawler pad assembly and said at least one hinge pin is located between said first and second retention elements and is retained within said substantially cylindrical chamber by said first and second retention elements, the total longitudinal length of said at least one hinge pin and said first and second retention elements not exceeding the longitudinal length of said substantially cylindrical chamber;

first means for securing said first retention element to a hinge knuckle completely encircling said first retention element; and

second means for securing said second retention element to

a hinge knuckle completely encircling said second retention element.

4,995,679

WHEEL ASSEMBLY FOR MOVING OBJECTS

Max Segerljung, Pl 7180, S-911 00 Vannas, Sweden

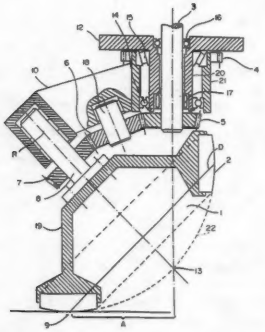
PCT No. PCT/SE87/00520, § 371 Date Jun. 9, 1989, § 102(e) Date Jun. 9, 1989, PCT Pub. No. WO88/03492, PCT Pub. Date May 19, 1988

PCT Filed Nov. 5, 1987, Ser. No. 353,633

Claims priority, application Sweden, Nov. 7, 1986, 8604781

Int. Cl.[5] B60B *33/00*

U.S. Cl. 301—5 R **8 Claims**



1. An assembly for moving an object with respect to a surface, said assembly comprising:

a first drive shaft having an axis about which said first drive shaft is adapted to rotate;

a wheel adapted to be assembled to said object and having a periphery defining a rolling plane including a rolling point resting against the surface and being spaced a radial distance from said first drive shaft;

means for mounting said first shaft for rotation about said axis, said mounting means comprising a plate having a sleeve and bearings supporting said first drive shaft for rotation about said axis with respect to said sleeve;

a second drive shaft rigidly connected to said wheel, said second drive shaft having an axis of rotation positioned such that said first drive shaft and said second drive shaft extend from a point o intersection of said axis of said first drive shaft and said axis of said second drive shaft at an angle greater than 0° but no greater than 90°; and

a transmission comprising a first gear wheel fixed for rotational movement with said first drive shaft, a second gear wheel fixed for rotational movement with said second drive shaft, and an intermediary gear wheel for transmitting rotational movement between said first drive shaft and said second drive shaft.

4,995,680

SAFETY DEVICE FOR CONCEALING APPARATUS

Alberto G. Miruri, Francisco Silvela, 76, 28028 Madrid, Spain

Filed May 2, 1989, Ser. No. 346,526

Claims priority, application Spain, May 4, 1988, 8801381; May 26, 1988, 8801699; Jun. 7, 1988, 8801844

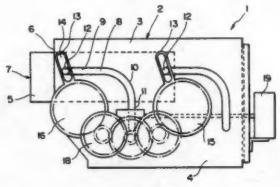
Int. Cl.[5] A47B *81/06*

U.S. Cl. 312—7.1 **8 Claims**

1. Safety device for concealing apparatus, particularly car radios and the like, comprising:

a case-receptacle for containing the apparatus therein and having two adjacent intercommunicated portions, the first portion, having at least one outward opening and containing the apparatus in an operative conspicuous position, and the second portion which is concealed from the outside, housing the apparatus in a concealed position;

guide means for guiding the apparatus in movement between the first position and the second position; and



electromechanical drive means operatively coupled to the apparatus for driving the apparatus between the said two positions along the guide means, wherein the apparatus has a casing and the guide means comprises guide slots made in the side walls of the case-receptacle cooperating with stems provided in the apparatus casing.

4,995,681

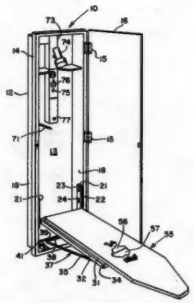
BUILT-IN IRONING CENTER

Clyde B. Parnell, Godwin, N.C., assignor to Fasco Industries, Inc., Lake Forest, Ill.

Filed Sep. 11, 1989, Ser. No. 405,201

Int. Cl.[5] A47B *5/00*

U.S. Cl. 312—242 **8 Claims**



1. A built-in ironing center, comprising

a housing disposed to be mounted in a recess in the wall of a room,

an ironing board comprising two interconnected sections,

means mounting said board on said housing for swinging movement into and out of an opening in the front of said housing, and about a first horizontal axis between a collapsed position in which said board is disposed within said housing, and an erected position in which said board is positioned externally of said housing for angular adjustment about a vertical axis,

one of said sections of said board being mounted for swinging movement in a horizontal plane about said vertical axis, when said board is in its erected position, and

means hingedly connecting the other of said sections at one end thereof to one end of said one section for swinging movement about a pair of spaced, parallel hinge axes between a folded position in which said other section overlies and is parallel to said one section, and an unfolded position in which said other section extends beyond said one end of said one section and in coplanar relation with said one section,

said means hingedly connecting together said sections comprising a first pair of hinge plates each of which is secured

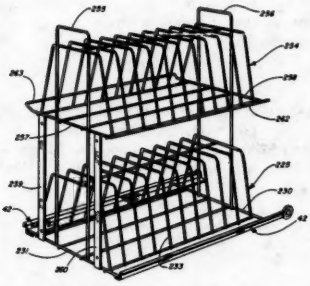
to a different one of said sections, and a second pair of plates pivotally connected to said first pair of plates and fixed in spaced, parallel relation to each other.

4,995,682

STORAGE FACILITY FOR VIDEO CASSETTES

Kenneth H. Gutner, 4505 Lindenwood La., Northbrook, Ill. 60062

Filed Jul. 28, 1988, Ser. No. 225,182
Int. Cl.[5] A47B *81/00*
U.S. Cl. 312—311 17 Claims



1. A storage facility for video cassettes comprising a case having storage space for cassettes defined by wall means accessible through front openable means, a pair of horizontally spaced apart guide means on said wall means extending rearwardly from said front opening means, a carrier for said cassettes equipped with horizontally spaced apart slide means in said space with said slide means being mounted in said guide means, said guide means having withdrawal means whereby said carrier can be withdrawn from said space, said carrier including a generally rectangular perimetric frame having said slide means fixed thereto and a plurality of spaced apart, parallel generally U-shaped wire elements extending across said perimetric frame form one side to the other to provide a plurality of slots for receiving a plurality of cassettes in side-by-side relation, each of said wire elements being spaced from an adjacent wire element a distance to receive a boxed video cassette, and straight wire member means secured to the underside of said frame and extending parallel to said slide means for supporting said cassettes, said carrier perimetric frame including four wire members interconnected to form a rectangle, said wire elements being fixed to two opposed wire members, said two opposed wire members being operably associated with said guide means, the other two of said wire members being extended beyond the first mentioned wire members to provide support means for said slide means, and a slide assembly fixed to said support means.

4,995,683

DRAWER PROVIDED WITH GUIDE MEANS

Alfred Albiez, Langen, Austria, assignor to Alfit Gesellschaft m.b.H., Götzis, Austria

PCT No. PCT/AT88/00108, § 371 Date Aug. 2, 1989, § 102(e) Date Aug. 2, 1989, PCT Pub. No. WO89/05109, PCT Pub. Date Jun. 15, 1989
PCT Filed Dec. 6, 1988, Ser. No. 392,937
Claims priority, application Austria, Dec. 7, 1987, 3212/87
Int. Cl.[5] A47B *88/00*
U.S. Cl. 312—348.4 13 Claims

1. A drawer comprising

(a) two vertically extending side walls,

(b) a drawer rail affixed to the outside of each side wall,

(c) a guide rail cooperating with each drawer rail for substantially horizontally guiding the drawer rails along the guide rails,

(d) a vertical front plate extending transversely to the side walls,

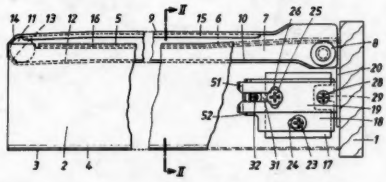
(e) an angle member fixedly securing the front plate to each side wall below the rails, each angle member having

(1) one leg affixed to the front plate adjacent the side walls and

(2) another leg projecting inwardly from the front plate and extending parallel to the side walls,

(f) an intermediate plate carried by each side wall at the outside thereof,

(g) an eccentric adjustment element engaging each intermediate plate and arranged for adjusting the vertical position of the intermediate plates with respect to the side walls and fixing the intermediate plates in the adjusted vertical position,



(h) an adjustment screw extending parallel to the front plate and connected to the other leg of each angle member, the adjustment screw having an axial pivot portion extending parallel to the front plate and pivotally supporting the other angle member leg on the respective intermediate plate for adjusting the inclination of the front plate affixed to the angle members, turning of the adjustment screw causing a lateral adjustment of the front plate with respect to the side walls, and

(i) at least one clamping screw for fixing the front plate in the pivotally and laterally adjusted position, the adjustment element and screws as well as the clamping screws being operable from the outsides of the side walls.

4,995,684

IMPACT RESISTANT AND TEMPERED OPTICAL ELEMENTS

Randal W. Tustison, Lexington; Dennis Montanari, West Townsend; Thomas Varitimos, Norwood, and Bernard diBenedetto, Wayland, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 875,893, Jun. 18, 1986, abandoned.
This application Apr. 20, 1989, Ser. No. 342,605
Int. Cl.[5] G02B *1/10, 5/28;* G32B *18/00, 33/00*
U.S. Cl. 350—1.6 43 Claims

1. An optical element comprising:

a base comprising a first material having an index of refraction at 10 microns in the range of about 2.2 to 3.3, a predetermined optical transmissivity over at least portions of a band of at least about 2 μm to 30 μm and a predetermined resistance to damage caused by high velocity water droplet impact;

means optically transparent over said portion of said band and disposed over said base for increasing the resistance of the base to damage caused by water droplet impact, comprising a second material having an index of refraction less than 2.0 at 10 microns and a physical thickness related to $((2[n]N+1)\lambda/4)/n_c$, when N is an integer, λ is a selected

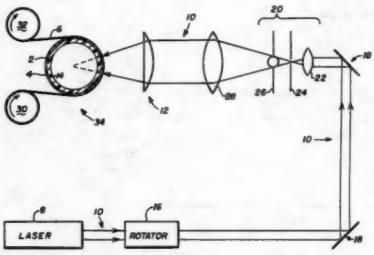
wavelength in the band, and N_c is the refractive index of the second material at the wavelength λ.

4,995,685

METHOD AND SYSTEM FOR MAKING A REFLECTION HOLOGRAM

Mark L. Armstrong, and Daniel J. Mickish, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 16, 1989, Ser. No. 352,505
Int. Cl.[5] G03H *1/02*
U.S. Cl. 350—3.65 25 Claims



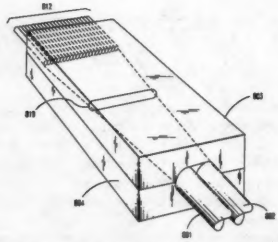
1. A system for making a reflection hologram comprising:
an at least partially reflective or diffractive master having a cylindrical surface symmetric about an axis;
a holographic recording medium coupled to the master cylindrical surface; and
means for directing a reference beam of substantially coherent radiation through the recording medium to the master cylindrical surface, the directing means including means for focusing the radiation so that the angle of incidence of the radiation on the master is substantially constant,
such that when the directing means directs the reference beam through the recording medium, an object beam reflects off the master and passes back through the recording medium interfering with the reference beams forming a reflection hologram in the recording medium.

4,995,686

OPTICAL SPLITTER/COMBINER WITH AN ADIABATIC MIXING REGION

Greg E. Blonder, Summit; Lee L. Blyler, Jr., Basking Ridge, both of N.J., and Gary J. Grimes, Thornton, Colo., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 22, 1989, Ser. No. 455,723
Int. Cl.[5] G02B *6/26, 6/28, 6/36*
U.S. Cl. 350—96.15 16 Claims



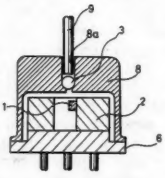
1. An optical device for transmitting optical signals between a first group of optical fibers and said first group of optical fibers are positioned in an linear array having a first cross-sectional shape and a second group of optical fibers and said second group of optical fibers having a second cross-sectional shape and said first cross-sectional shape being different than said second cross-section shape, and comprising:
an optical mixing core;
an optical cladding surrounding said optical mixing core;
a first end of said optical mixing core having an oblately circular shape substantially matching said first cross-sectional shape and said first group of optical fibers being connected to said first end;
a second end of said optical mixing core substantially matching said second cross-sectional shape and said second group of optical fibers being connected to said second end; and
the cross-sectional shape of said optical mixing core gradually changing from said first end to said second end whereby an mixing region is formed for communicating said optical signals.

4,995,687

SEMICONDUCTOR LASER DEVICE AND A METHOD OF PRODUCING SAME

Seiichi Nagai; Mitsuo Ishii, and Kazuyoshi Hasegawa, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Oct. 23, 1989, Ser. No. 425,021
Claims priority, application Japan, Nov. 18, 1988, 63-293415
Int. Cl.[5] G02B *6/42*
U.S. Cl. 350—96.2 4 Claims



1. A semiconductor laser comprising a stem having a central portion and a peripheral flange outwardly extending therefrom, a heat sink mounted on said central portion of said stem, a laser diode chip mounted on said heat sink, a cap having a top, a generally cylindrical side wall with an inside dimension larger than said central portion of said stem, and a peripheral skirt transverse to said side wall extending from said side wall and fixedly mounted on said peripheral flange of said stem so that said cap covers said chip, said top of said cap including a penetrating aperture aligned with said laser diode chip, a lens disposed in said penetrating aperture proximate said laser diode chip for collimating light emitted from said laser diode chip, and an optical fiber disposed in the penetrating aperture at a desired depth and fixedly mounted to said cap for guiding the collimated light, whereby said cap and stem can be adjusted relative to each other in a plane before being fixedly mounted to each other and said optical fiber can be adjusted in the penetrating aperture before being fixedly mounted to said cap to achieve a desired coupling of light between said laser diode chip and said optical fiber.

4,995,688

OPTICAL FIBER DISTRIBUTION FRAME

Mark A. Anton, Minneapolis; Jory A. Steinman, Golden Valley; Paul A. Suek, Minneapolis, and Wayne A. Johnson, Rosemount, all of Minn., assignors to ADC Telecommunications, Inc., Minneapolis, Minn.

Filed Jul. 31, 1989, Ser. No. 388,060
Int. Cl.[5] G02B *6/24*
U.S. Cl. 350—96.10 11 Claims

8. An optical fiber distribution frame comprising:
a frame member having walls defining a frame interior, said

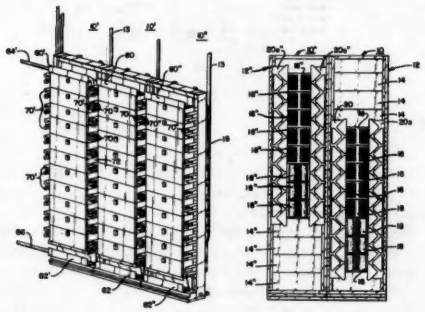
frame member having a plurality of cabinet attachment locations;

a plurality of cabinets sized to be received within said interior;

said plurality of cabinets including at least one splice cabinet having means for splicing together optical fibers; and

said plurality of cabinets also including at least one storage cabinet having means for temporarily storing excess lengths of optical fibers;

said plurality of cabinets including at least one connector cabinet having a panel accessible through both a rear and a forward face of said connector cabinet, a plurality of optical fibers connections including at least a first and second design of connectors of differing known dimen-



sions and selected to couple a pair of optical fibers, said connector cabinet including a plurality of adapters each having attachment means for attachment of said adapters to said panel, said plurality of adapters including at least a first and second design selected to receive and retain said first and second connector design, respectively;

said attachment means attaching said adapters to said panel with a first set of fibers connected to first ends of said connectors and extending from a said face and with a second set of fibers connected to second ends of said connectors and extending from said forward face; and

attachment means for releasably attaching said plurality of cabinets to said frame member at said attachment locations.

4,995,689

WAVEGUIDE SCANNER

Sanwal P. Sarraf, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 9, 1989, Ser. No. 390,956

Int. Cl.[5] G02B *6/10*; G02F *1/29*

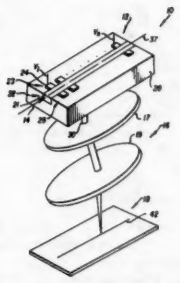
U.S. Cl. 350—96.14 **13 Claims**

1. A scanner comprising:

a substrate formed of an optical material;

a thin film optical channel waveguide formed on said substrate;

a first linear array of electrodes formed on one side of said waveguide and a second linear array of waveguides formed on an opposite side thereof, said electrodes extending in a first direction and the electrodes in each array being generally parallel to each other;



means for regulating a voltage on said electrodes to electro-optically induce a local change in the refractive index of the waveguide across the thickness thereof;

means for coupling a coherent light beam into said waveguide in a second direction transverse to said first direction, said beam propagating in said second direction and being radiated into the substrate under said waveguide upon encountering said refractive index change; and

means for coupling the beam out of said waveguide.

4,995,690

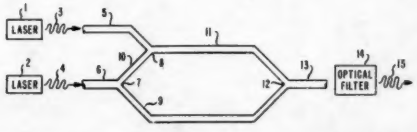
MODULATION INSTABILITY-BASED FIBER INTERFEROMETRIC SWITCH

Mohammed N. Islam, 49 Cresci Blvd., Hazlet, N.J. 07730

Filed Apr. 24, 1989, Ser. No. 342,271

Int. Cl.[5] G02B *6/26, 6/10*; G02F *1/03*

U.S. Cl. 350—96.15 **16 Claims**



1. An optical switch comprising

an input for a control signal,

an input for a pump signal,

an intermediate waveguide means having first and second separate paths for supporting optical signal transmission on each of said paths,

means for coupling said pump signal input to each of said first and second paths,

means for coupling said control signal input to said first path,

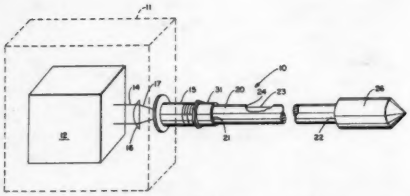
means for combining said first and second optical paths into an output for producing an output signal having first and second states, wherein modulation instability is caused to occur in said first path in the presence of said control signal to produce said output signal in said first state and wherein said output signal is produced in said second state in the absence of said control signal.

4,995,691

ANGLED OPTICAL FIBER INPUT END FACE AND METHOD FOR DELIVERING ENERGY

Earl E. Purcell, Jr., Westfield, Mass., assignor to Ensign-Bickford Optics Company, Conn.

Filed Oct. 16, 1989, Ser. No. 421,677
Int. Cl.[5] G02B 6/26
U.S. Cl. 350—96.15 18 Claims



1. A fiber optic probe for use with a laser light source having an axis of light at an output angle with respect to an optical axis of said probe, comprising:

a length of optical fiber having a core and a cladding, said core having a range of available modes determined by a numerical aperture of said core, said core and said cladding each having an index of refraction, said core being selected with a higher index of refraction than said cladding, thereby allowing light to propagate the length of said fiber in the modes of said core;

an output end at one end of said fiber having a diffuser for dispersing the light propagated through said fiber; and

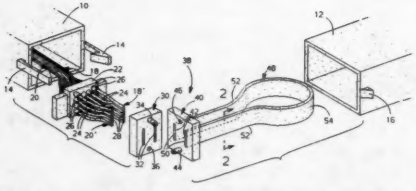
an input end at the other end of said fiber for coupling light from said laser into said fiber, said input end having an end face angle, said end face angle defined as the angle between a plane normal to said optical axis and the plane of the input end face, said end face angle being selected for exciting desired modes of said fiber, thereby producing a desired light distribution dispersed from said diffuser.

4,995,692

FIBER OPTIC STAR COUPLER

Laura K. Diliello; Gregory D. Miller, both of Warren, and Robert E. Steele, Cortland, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 6, 1990, Ser. No. 475,569
Int. Cl.[5] G02B 6/28
U.S. Cl. 350—96.16 14 Claims



1. A fiber optic star assembly for coupling signals between optical fibers comprising:

first and second sets of optical fibers, the sets having contiguous fiber ends arranged in respective parallel linear arrays,

a flexible optical ribbon bent into a non-planar configuration having a curved center portion and closely spaced parallel end portions, the minimum radius of curvature of the curved center portion being sufficiently large to avoid significant optical loss due to curvature, the end portions being spaced by a distance substantially less than the said minimum radius of curvature, the ribbon having a width substantially matching the width of each linear array, and

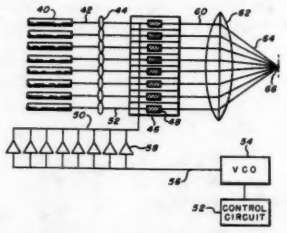
means for holding each linear array of fiber ends in line with the ribbon end portions for coupling between the fibers and the ribbon.

4,995,693

MULTI-POSITION OPTO-ELECTRONIC SWITCH

Mark L. Wilson, Vadnis Heights, Minn., assignor to Unisys Corporation, Blue Bell, Pa.

Filed Aug. 5, 1988, Ser. No. 228,617
Int. Cl.[5] G02B 6/32
U.S. Cl. 350—96.18 8 Claims



1. An acousto-optic switch for selectively coupling an optical signal from one of a plurality of input terminals to one of a plurality of output terminals, comprising:

means coupled to said input terminals for collimating incident optical signals to provide collimated optical signals,

means for producing an RF control signal at a selectable one of a plurality of preselected frequencies,

a plurality of acousto-optic elements comprised of telurium dioxide crystals arranged in a linear array and positioned to intercept said collimated optical signals for selectively deflecting said collimated optical signals in a plane normal to said array at angles dependent upon the frequency of said RF control signal, the angle of deflection of an optical signal through each element of said array being individually and independently controllable by applying said RF signal to each of said acousto-optic elements and by varying said frequency to a predetermined one of said preselected frequencies,

a scan lens positioned to intercept said deflected optical signals for focussing to focal points in a focal plane that is orthogonal to a plane defined by an optical axis of said lens and a plane of said linear array, and

means for positioning said plurality of output terminals to be coincident with said focal points, whereat any of said optical signals may be coupled to any of said output terminals,

wherein said means for collimating comprises beam forming optics in the path of said light beams for expanding each of said beams, and

wherein said plurality of acousto-optic elements is comprised of Bragg cell elements.

4,995,694

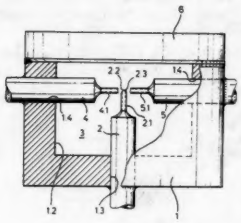
FIBER OPTICAL BEAM SPLITTING DEVICE

Robert Rieger, Ostermüchen, and Bodo Tilly, Grafing, both of Fed. Rep. of Germany, assignors to Messerschmitt-Bolkow-Blohm GmbH, Fed. Rep. of Germany

Filed Mar. 16, 1990, Ser. No. 494,630
Claims priority, application Fed. Rep. of Germany, Mar. 16, 1989, 3908530
Int. Cl.[5] G02B 6/34
U.S. Cl. 350—96.19 8 Claims

1. A fiber-optical beam splitting device for the coupling in or out of light into or out of an optical fiber from or into different directions of the environment of the optical fiber, wherein at least one front face of the optical fiber is constructed in the

shape of a prism, the angle Y between the longitudinal axis of the fiber and a surface of the prism following the condition



$$\frac{1}{3}\left(180° - \arcsin\frac{n_2}{n_1} - \right.$$

$$\arcsin\frac{n_3}{n_1} \leqq \gamma \leqq \arcsin\frac{n_2}{n_1} - \arcsin\frac{n_3}{n_1}$$

wherein

n_1 = the refraction index of the fiber core,

n_2 = the refraction index of the fiber cladding,

n_3 = the refraction index of the medium surrounding the optical fiber.

4,995,695

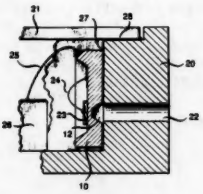
OPTICAL ASSEMBLY COMPRISING OPTICAL FIBER COUPLING MEANS

Richard J. Pimpinella, Hampton; John M. Segelken, Morristown; King L. Tai, Berkeley Heights, and Ross J. Thompson, Budd Lake, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 17, 1989, Ser. No. 394,911

Int. Cl.[5] G02B *6/36, 7/26*

U.S. Cl. 350—96.20 **16 Claims**



1. An optical assembly comprising

(a) a housing having at least one aperture therein;

(b) at least one optical or elector-optical device (collectively "device") inside the housing; and

(c) optical fiber connector means adapted for sealing the aperture, for receiving the end of an optical fiber, and for maintaining the end of the fiber in optical coupling relationship with respect to the device;

the optical fiber connector means comprise a radiation-transmissive member attached to the housing such that it seals the aperture in the housing; wherein the radiation-transmissive member has a first and a second surface, with the first surface facing outwardly of the housing, the radiation-transmissive member comprising a recess that extends from one of the surfaces towards the other surface, leaving a "septum" of material between the bottom of the recess and the other surface; the device being maintained in predetermined position with respect to the recess; the connector means further comprising means for holding the end of the optical coupling relationship with the device, with the radiation to be transmitted through the septum.

4,995,696

OPTICAL AMPLIFIER MODULE

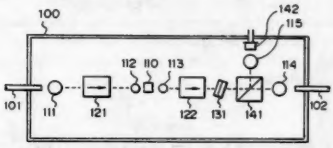
Eiichi Nishimura, and Yasuaki Tamura, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 354,442, May 17, 1989, abandoned. This application Mar. 15, 1990, Ser. No. 494,852

Claims priority, application Japan, May 20, 1988, 63-121806

Int. Cl.[5] G02B *6/36;* **G02F** *1/00*

U.S. Cl. 350—96.2 **24 Claims**



1. An optical amplifier module comprising:

(a) a package for housing constituent elements;

(b) an input optical fiber disposed on the input side of the module for guiding an input optical signal into the module;

(c) an output optical fiber disposed on the output side of the module for taking out an output optical signal to the outside;

(d) a semiconductor laser chip disposed between the input optical fiber and the output optical fiber for amplifying the input optical signal into the output optical signal;

(e) first collimator means disposed between the input optical fiber and the semiconductor laser chip for collimating the input optical signal and for optically coupling the input optical fiber with the semiconductor laser chip through an input parallel light beam;

(f) second collimator means disposed between the semiconductor laser chip and the output optical fiber for collimating the output optical signal and for optically coupling the semiconductor laser chip with the output optical fiber through an output parallel light beam;

(g) first isolator means disposed on the input side of the semiconductor laser chip; and

(h) second isolator means disposed on the output side of the semiconductor laser chip.

4,995,697

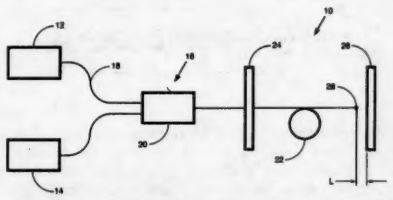
FIBER OPTIC SENSING SYSTEM

Grigory Adamovsky, Solon, Ohio, assignor to The United States of America as represented by the administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Sep. 7, 1989, Ser. No. 404,291

Int. Cl.[5] G02B *6/02, 6/16;* **G01B** *9/02*

U.S. Cl. 350—96.29 **4 Claims**



1. A fiber optic sensing system responsive to an independent sensed parameter comprising

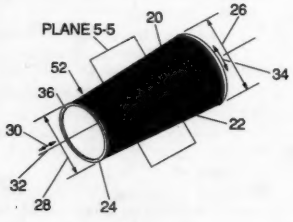
a light source for sending an initial signal intensity modulated at RF frequencies,
an interferometric sensor head for receiving said initial signal, said sensor head having a plurality of arms for splitting said signal and recombining the same thereby forming an interference field,
means for generating changes in the relative intensities of the split signal propagating in said arms in response to alterations in said independent sensed parameter thereby producing variations in said interference field, said means including
sensing elements in at least one of said arms in said interferometric sensor head to generate said changes in said relative intensities of said split signal, said sensing elements being exposed to said sensed parameter,
a photodetector for monitoring said variations, and
a fiber optic link for transmitting said signal between said light source, said interferometric sensor head, and said photodetector.

4,995,698

FIBER OPTIC CANISTER HAVING ORTHOTROPIC, CONTROLLED THERMAL EXPANSION BOBBIN

James R. Myers, Tucson, Ariz., assignor to Hughes Aircraft Company, Los Angeles, CA

Filed Dec. 30, 1988, Ser. No. 292,210
Int. Cl.[5] G02B *6/00*
U.S. Cl. 350—96.29 **20 Claims**



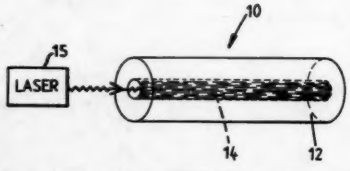
10. A fiber optic canister, comprising:
a bobbin formed at least in part from an orthotropic material, said orthotropic material being a composite material of structural fibers embedded in a polymer matrix; and
an optical fiber wound onto the bobbin.

4,995,699

ELECTRICALLY CONDUCTIVE SOLUTION COMPRISED OF CHARGED BOSON IONS

Shui-Yin Lo, Sherman Oaks, Calif., assignor to Apricot S.A., Notre-Dame, Luxembourg

Filed Nov. 9, 1987, Ser. No. 118,709
Int. Cl.[5] G02B *6/20*
U.S. Cl. 350—96.32 **63 Claims**



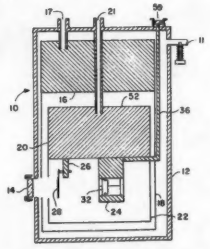
1. An electrical conductor comprising a solution containing charged boson ions, and means confining the solution and permitting application of electric potential thereto for current flow through the solution, said conductor further comprising means for subjecting the solution to electromagnetic waves to render said solution superconducting to said current.

4,995,700

CRYOGENIC SHUTTER

Richard D. Barney, and Thomas J. Magner, both of Laurel, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Mar. 31, 1989, Ser. No. 331,119
Int. Cl.[5] G02B *26/02, 27/00*
U.S. Cl. 350—266 **14 Claims**



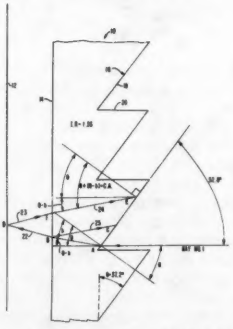
1. A dewar mechanism for decreasing or eliminating temperature gradients in mirrors or detectors operating in a cryogenic or cryogenic zero gravity environment where said mirrors or detectors may be viewed through a window comprising:
a housing having a window;
means for evacuating said housing;
a first reservoir containing a cryogenic element;
a first shroud coupled to said first reservoir;
a second reservoir containing a cryogenic element mounted inside said first shroud;
a second shroud coupled to said second reservoir and mounted within said first shroud;
a cryogenic plate mounted to said second reservoir;
means for mounting a mirror within said second shroud; and
means for shielding said mirror from radiation passing through said window.

4,995,701

ANTI-GLARE FILTER WITH IMPROVED VIEWING AREA

John W. Brown, Sea Girt, N.J., assignor to Qantix Corporation, Flemington, N.J.

Filed Mar. 6, 1989, Ser. No. 319,525
Int. Cl.[5] G02B *27/00*
U.S. Cl. 350—276 R **15 Claims**



1. A filter for reducing the glare of a viewing screen caused by ambient light and increasing the vertical viewing area, comprising a substantially transparent sheet of material having first and second faces, said first face being substantially planar and said second face having a plurality of V-shaped grooves,

each groove being formed by a sloping wall and a substantially horizontal wall, said sloping wall being inclined at an angle with respect to said first face at least equal to or greater than the computed angle θ determined by the equation:

$$\sin(\text{angle } \theta) = \text{I.R.} \times \sin(2 \text{ angle } \theta - \text{C.A.}),$$

Where:

I.R. = the Index of Refraction of the filter material, and

C.A. = the Critical Angle of the filter material.

4,995,702

PROJECTION-TYPE DISPLAY DEVICE

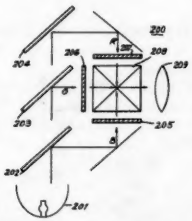
Shuji Aruga, Nagano, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan

Filed Oct. 30, 1987, Ser. No. 114,996

Claims priority, application Japan, Oct. 31, 1986, 61-260253; Dec. 23, 1986, 61-307282; Dec. 23, 1986, 61-307283; Jul. 21, 1987, 62-181333

Int. Cl.[5] G02F 1/13

U.S. Cl. 350—331 R **18 Claims**



1. A projection-type display device in which light representative of the image to be projected is produced by a plurality of light valves, comprising:

a first light valve having a first twisted nematic liquid crystal cell with a birefringence Δn_1 and a thickness d_1, the value of Δn_1 being selected for controlling the red wavelength of light incident thereto;

a second light value having a second twisted nematic liquid crystal cell with a birefringence Δn_2 and a thickness d_2, the value of Δn_2 being selected for controlling the green wavelength of light incident thereto;

a third light valve having a third twisted nematic liquid crystal cell with a birefringence Δn_3 and a thickness d_3, the value of Δn_3 being selected for controlling the blue wavelength of light incident thereto; and

synthesizing means for adding the red, green and blue wavelengths of light transmitted through the respective first, second and third light valves prior to projection by the device;

wherein the values of Δn_1, Δn_2 and Δn_3 are unequal.

4,995,703

ACTIVE MATRIX LIQUID CRYSTAL COLOR DISPLAY PANEL HAVING SPLIT PIXEL ELECTRODES

Kesao Noguchi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Sep. 26, 1985, Ser. No. 780,214

Claims priority, application Japan, Sep. 26, 1984, 59-200920; Oct. 18, 1984, 59-219039

Int. Cl.[5] G02F 1/13

U.S. Cl. 350—333 **15 Claims**

7. An active matrix liquid crystal display panel comprising:

a plurality of picture elements formed on an insulating substrate in the form of a matrix,

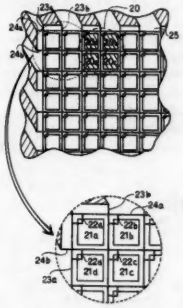
a plurality of scanning lines arranged to define rows of the matrix, and

a plurality of signal lines arranged to define columns of the matrix,

each picture element being divided into a plurality of display electrodes,

each display electrode being connected to one of said plurality of scanning lines and one of said plurality of signal lines through a switching element,

each pair of the adjacent picture elements respectively, belonging to different rows or columns of the matrix are staggered with respect to each other at least a width of one of said display electrodes pieces in a horizontal or vertical direction respectively, and



wherein at least one of the scanning lines and the signal lines connected to one picture element consists of a plurality of sub-lines and said display electrodes are interposed between adjacent sub-lines thereby separating said sub-lines by at least the width of one of said display electrodes.

4,995,704

LIQUID CRYSTAL DISPLAY DEVICE

Tomiaki Yamamoto, Chigasaki; Akio Murayama, Kamakura; Susmu Kondo, Yokosuka; Hitoshi Hato, Yokohama; Shinichi Kamagami, Yokohama, and Shoichi Matsumoto, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Asaki, Japan

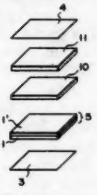
Filed Jul. 7, 1989, Ser. No. 376,541

Continuation-in-part of Ser. No. 376,659 and 376,653, both filed Jul. 7, 1989 which is a continuation of Ser. No. 385,535 filed Jul. 25, 1989

Claims priority, application Japan, Jul. 8, 1988, 63-169014; Jul. 8, 1988, 63-169017

Int. Cl.[5] G02F 1/13

U.S. Cl. 350—334 **4 Claims**



1. A liquid crystal display device comprising:

a liquid crystal cell including two substrates which are arranged substantially parallel to each other and have electrodes on opposing surfaces thereof, and a liquid crystal composition being held between said substrates such that the liquid crystal molecules are arranged in a twisted mode of 180° to 360°;

first and second polarizers arranged at both sides of said liquid crystal cell; and

first and second optical delay plates arranged between said liquid crystal cell and said second polarizer, with an optical axis of one delay plate being shifted from an optical axis of the other delay plate;

wherein assuming that a retardation value of said liquid crystal cell is given by:

$$R_0 = \Delta n.d.\cos^2\theta$$

wherein Δn is the optical anisotropy of said liquid crystal composition, d is the distance between said two substrates in said liquid crystal cell, and θ is the tilt angle of said liquid

crystal composition, and wherein a total of the retardation values of said first and second optical delay plates is $R_0 \times 0.8$ to $R_0 \times 1.2$.

4,995,705

DEVICE, METHOD AND APPARATUS FOR OPTICAL MODULATION USING FERROELECTRIC POLYMER LIQUID CRYSTALS

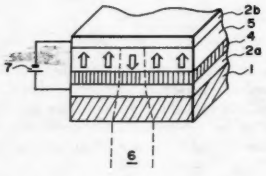
Kazuo Yoshinaga, Machida; Takeshi Miyazaki, Kawasaki; Toshikazu Ohnishi, Tokyo; Yutaka Kurabayashi, Yokohama; Yoshio Takasu, Tama, and Tadashi Kobayashi, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 16, 1987, Ser. No. 133,797

Claims priority, application Japan, Dec. 17, 1986, 61-300876; Dec. 26, 1986, 61-310826; Dec. 26, 1986, 61-310827; Jul. 7, 1987, 62-169435

Int. Cl.[5] G02F *1/13*

U.S. Cl. 350—350 S **48 Claims**



1. An optical modulation method, comprising:

writing in a ferroelectric having a spontaneous polarization and a glass transition point by applying an electric field to the ferroelectric heated at or above the glass transition point to orient the spontaneous polarization of the ferroelectric to a prescribed direction, and

holding the prescribed direction of the spontaneous polarization below the glass transition point.

4,995,706

LIQUID CRYSTAL DEVICE WITH A FERROELECTRIC THIN FILM

Takashi Inujima, Atsugi; Shunpei Yamazaki, Tokyo; Toshimitsu Konuma; Toshiji Hamatani, both of Atsugi; Mitsunori Sakama, Hiratsuka; Toshiharu Yamaguchi, Zama, and Ippei Kobayashi, Atsugi, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

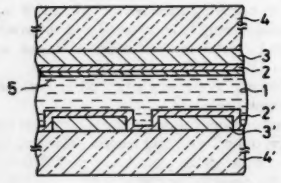
Continuation of Ser. No. 282,850, Dec. 9, 1988, abandoned, which is a continuation of Ser. No. 934,911, Nov. 25, 1986, abandoned. This application Aug. 14, 1989, Ser. No. 394,265

Claims priority, application Japan, Nov. 25, 1985, 60-265333

The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.

Int. Cl.[5] G02F *1/13*

U.S. Cl. 350—350 S **8 Claims**



1. A liquid crystal device comprising:

a pair of substrates;

a ferroelectric liquid crystal layer interposed between said substrates;

at least one first electrode formed on one of said substrates;

a ferroelectric film having a thickness less than 1000 Å and interposed between said first electrode and said liquid crystal layer and made of an organic material comprising fluorine;

at least one second electrode formed on the other substrate located opposing to said one first electrode so that the state of said liquid crystal layer is controlled by an electric field induced by the opposing electrodes where said electric field is applied across said liquid crystal layer and said ferroelectric film in series; and

an organic film interposed between said second electrode and said liquid crystal layer.

4,995,707

VARI-FOCAL LENS SYSTEM

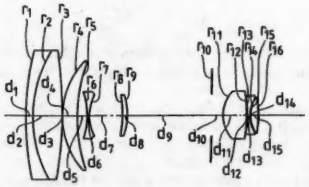
Takeshi Hashimoto, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jan. 19, 1989, Ser. No. 299,159

Claims priority, application Japan, Jan. 20, 1988, 63-8379

Int. Cl.[5] G02B *15/14, 13/18*

U.S. Cl. 350—427 **28 Claims**



1. A vari-focal lens system comprising:

a first lens unit having positive refractive power;

a second lens unit movable for varying focal length and having negative refractive power;

a third lens unit movable for varying focal length and having positive refractive power; and

a fourth lens unit kept fixed during variation of focal length;

said second lens unit and said third lens unit being shifted along an optical axis while varying airspace reserved therebetween for varying focal length and correcting deviation of image position caused by variation of focal length, said second lens unit consisting of a single biconcave lens component having an aspherical surface, said third lens unit consisting of a single lens component having positive refractive power, and said aspherical surface of said second lens unit satisfying the following condition

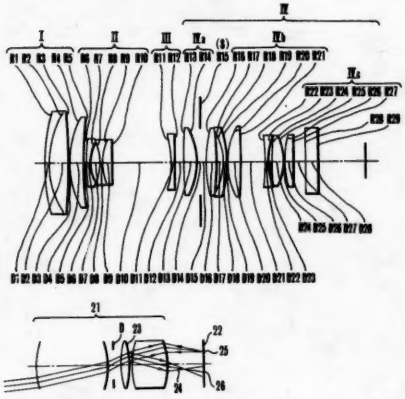
$$(1)\ 3\times10^{-3} < |\Delta X \cdot r/h \cdot f_w| < 5\times10^{-1}$$

wherein the reference symbol r represents a radius of curvature on the standard spherical surface of the aspherical surface used in the second lens unit, the reference symbol h designates distance from the optical axis to the intersection between the ray to attain to the maximum image height and said aspherical surface, the reference symbol Δx denotes deviation of said intersection from the standard spherical surface in the direction along the optical axis, and the reference symbol f_w represents focal length of the vari-focal lens system as a whole at a wide position thereof.

4,995,708
PHOTOGRAPHIC LENS FREE FROM FORMING OF GHOST IMAGE

Muneharu Sugiura, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 22, 1988, Ser. No. 223,108
Claims priority, application Japan, Aug. 5, 1987, 62-196569
Int. Cl.[5] G02B *15/14*
U.S. Cl. 350—427 6 Claims



1. A photographic lens having from the object side a first positive lens unit for focusing, a second negative lens unit movable for varying image magnification, a third negative lens unit movable for compensation of movement of an image plane, a bi-convex lens having a surface of larger curvature on its image side than its surface on the object side, a diaphragm, and front and rear sub-units each composed of a plurality of lenses, said front and rear sub-units each including a negative lens, wherein said bi-convex lens and said front and rear sub-units together comprise a fourth lens unit that is an image forming lens unit located on the image side of said diaphragm and predetermined lens surfaces of said image forming lens unit have shapes so defined that said predetermined lens surfaces reflect rays of light which form an image on a predetermined image plane or thereabout among rays of light which are reflected from the predetermined image plane or a neighborhood thereof, and then return to said photographic lens so that said rays of light reflected from a predetermined lens surface will form an image at a position near said photographic lens relative to the predetermined image plane.

4,995,709
OPTICAL COLLIMATOR

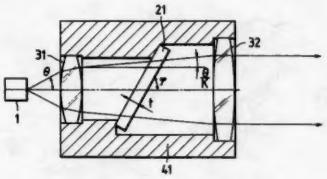
Kazuo Iwata; Takuma Satou, and Satoru Shibata, all of Gunma, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 5, 1989, Ser. No. 376,413
Claims priority, application Japan, Jul. 15, 1988, 63-175217
Int. Cl.[5] G02B *27/00*
U.S. Cl. 350—447 10 Claims

1. An optical collimator for converting rays of light outputted by a light source into substantially parallel rays of light, comprising:

front and rear collimator lenses obtained by dividing one collimator lens into two relatively smaller lenses, thereby reducing the angle of divergence of light between said front and rear collimator lenses; and

an inclined transparent parallel flat plate held between said front and rear collimator lenses thereby reducing astigmatism.

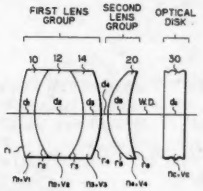


whereby an optical collimator structure of reduced size can be provided.

4,995,710
OBJECTIVE LENS FOR OPTICAL DISK

Seizoh Suzuki, Tokyo, and Osamu Endou, Kawasaki, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed May 25, 1990, Ser. No. 528,491
Claims priority, application Japan, May 31, 1989, 1-137806
Int. Cl.[5] G02B *9/06, 21/02*
U.S. Cl. 350—480 5 Claims



1. An objective lens for an optical disk comprising:

a first lens group constructed by joining a negative meniscus lens, a biconvex lens, and a negative meniscus lens sequentially arranged from the side of a light source; and

a second lens group constructed by a positive meniscus lens;

said first and second lens groups being sequentially arranged from the side of the light source toward the side of the optical disk;

a combined focal distance f of the entire lens system, a focal distance f_1 of the first lens group, a radius r_i (i=1 to 6) of curvature of an i-th lens face from the side of the light source, and a refractive index n_j and an Abbe number ν_j (j=1 to 4) of a j-th lens from the side of the light source satisfying the following conditions,

(I) $0.7<f^2/|r_2 \cdot r_3|<2.0$, $r_2>0$, $r_3<0$

(II) $2.0<[(n_1-1)+(n_3-1)]/(n_2-1)<3.0$

(III) $15<[(\nu_2-\nu_1)+(\nu_2-\nu_3)]<90$

and

(IV) $2.0<(f_1/f)<6.0$.

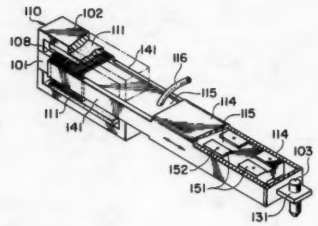
4,995,711
SLIDE TABLE

Kuninori Imai, Kanagawa; Takeji Shiokawa, Fuchu; Shigeo Kato, Mitaka; Isao Ishikawa, Takasaki; Toshimichi Ikeda, Ushiku, and Kan Otake, Tsuchiura, all of Japan, assignors to Hitachi, Ltd. and Hitachi Construction Machinery Co., Ltd., both of Tokyo, Japan

Filed Dec. 14, 1989, Ser. No. 450,548
Claims priority, application Japan, Dec. 16, 1988, 63-316415
Int. Cl.[5] G02B *21/26, 21/00*
U.S. Cl. 350—529 12 Claims

1. A slide table comprising an inner member a sheath shaped outer member at least partly engaged with said inner member, air bearings provided between at least a part of said inner

member and said sheath shaped outer member for enabling said sheath shaped outer member to be movable relative to said



inner member, and motor means for moving said sheath shaped outer member relative to said inner member.

4,995,712

LIGHT RADIATION STAND

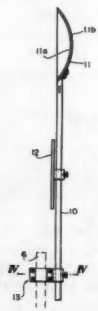
Kei Mori, 3-16-3-501, Kaminoge, Setagaya-ku, Tokyo, Japan

Filed Oct. 30, 1989, Ser. No. 429,872

Claims priority, application Japan, Mar. 28, 1989, 1-35235

Int. Cl.[5] G02B *5/08, 7/18*

U.S. Cl. 350—603 **1 Claim**



1. A light radiation stand comprising a stand base, holding means mounted on said stand base, fiber optic cable means for transmitting solar rays, said holding means holding said cable means on said stand base such that light rays emitted from said cable means are directed in a desired direction, an elongated pole, mounting means removably mounting said pole on said stand base, said elongated pole having a longitudinal axis and an outer end, first mirror means rotatably mounted on said outer end of said pole for rotation about a rotary axis coincident with said longitudinal axis of said pole, said first mirror means having two sides, one of said sides being a concave mirror surface, the other of said sides being a convex mirror surface, a second mirror means, and support means supporting said second mirror means on said pole between said outer end of said pole and said mounting means, said second mirror means being mounted on said pole for rotation about said longitudinal axis.

4,995,713

SPECTACLE FRAME

Caterino Curto, and Gianantonio Longo, both of Segusino, Italy, assignors to F.A.O.M.S., Italy

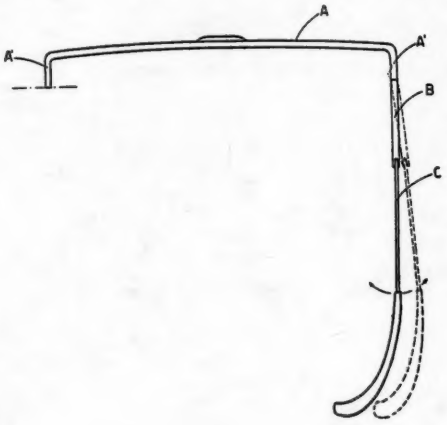
PCT No. PCT/IT87/00032, § 371 Date Apr. 11, 1989, § 102(e) Date Apr. 11, 1989, PCT Pub. No. WO88/02870, PCT Pub. Date Apr. 21, 1988

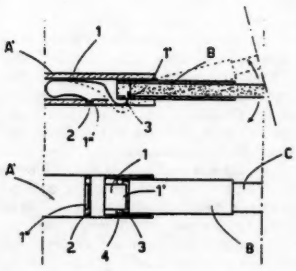
PCT Filed Apr. 9, 1987, Ser. No. 353,631

Claims priority, application Italy, Oct. 20, 1986, 82585 A/86

Int. Cl.[5] G02C *5/16, 5/14, 5/22*

U.S. Cl. 351—113 **4 Claims**





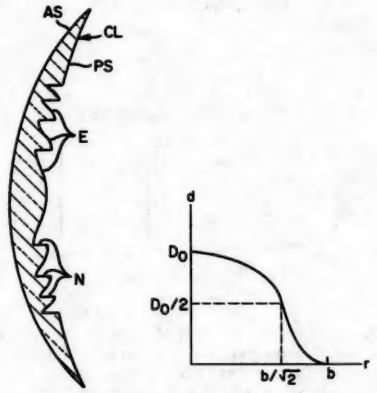
1. A spectacle frame comprising a lens retaining portion (A) with lateral extensions (A') allowing flexible articulation of the side arms (C), characterised in that said extensions (A') are hollow and open in the direction of the side arms (C), each side arm (C) being provided with a connection part (B) having an internal transverse slot (3), and that, for each side arm, an S-shaped spring is situated in the hollow of said extension (A') (1), said spring forming a hook (1', 1'') at each end, and the first end (1') being insertable into said slot (3) of connection part (B) while the other end (1'') is insertable into said hollow extension (A'), said extension (A') being formed to allow articulation of said arms (C).

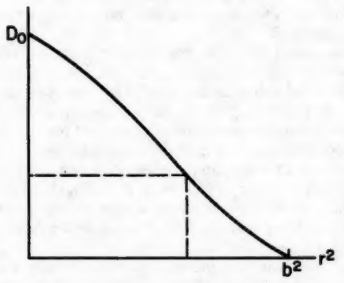
4,995,714

MULTIFOCAL OPTICAL DEVICE WITH NOVEL PHASE ZONE PLATE AND METHOD FOR MAKING

Allen L. Cohen, 10010 Walsham Ct., Richmond, Va. 23233

Continuation of Ser. No. 237,292, Aug. 26, 1988, abandoned.
This application Dec. 22, 1989, Ser. No. 456,228
Int. Cl.[5] G02C 7/04; G02B 27/44, 3/08; A61F 2/16
U.S. Cl. 351—161 17 Claims





1. A diffractive multifocal optical element comprising a phase zone plate of a Cohen lens design containing rotationally symmetrical, curved repetitive patterns designed to operate at a specific wavelength and which are also curved in r^2 space.

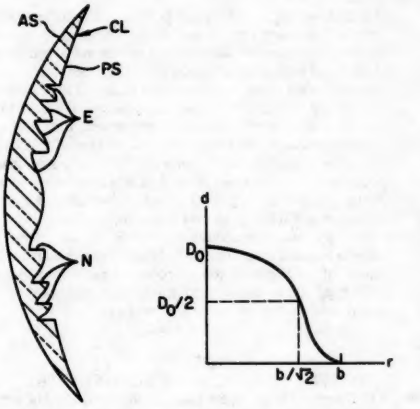
4,995,715

DIFFRACTIVE MULTIFOCAL OPTICAL DEVICE

Allen L. Cohen, 10010 Walsham Ct., Richmond, Va. 23233

Continuation of Ser. No. 222,000, Jul. 20, 1988, abandoned, which is a continuation-in-part of Ser. No. 863,069, May 14, 1986. This application Dec. 22, 1989, Ser. No. 456,230
Int. Cl.[5] G02C 7/04; G02B 27/44, 3/08; A61F 2/16
U.S. Cl. 351—161 27 Claims

1. A diffractive multifocal optical element comprising a phase zone plate containing a plurality of annular concentric zones which are spaced substantially proportional to $\sqrt{n}$, where n is the zone number, and each of the zones including at least one stepped facet for introducing a discontinuity in optical path length of less than $\lambda/2$, where λ is the design wavelength of the phase zone plate.

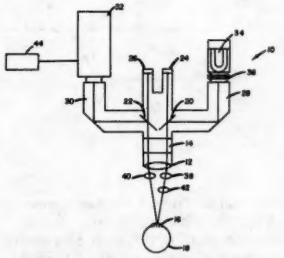


4,995,716

METHOD AND APPARATUS FOR OBTAINING THE TOPOGRAPHY OF AN OBJECT

Joseph W. Warnicki, Pittsburgh; Paul G. Rehkopf, Murrysville, both of Pa.; James L. Cambier, Rome, and Salvins J. Strods, Waterville, both of N.Y., assignors to Par Technology Corporation, New Hartford, N.Y.

Filed Mar. 9, 1989, Ser. No. 321,252
Int. Cl.[5] A61B 2/10
U.S. Cl. 351—212 50 Claims



1. In a system for obtaining the topography of a cornea of an eye of a patient through a rasterstereographic technique, an apparatus comprising:

a frame positionable generally adjacent to said eye under examination,

light projection means carried by said frame and arranged generally in a first pathway in line with said eye for illuminating said eye,

grid means carried by said frame and arranged in said first pathway in the same plane in line with and between said light projection means and said eye for creating a grid pattern projected onto said eye upon operation of said light projection means,

said eye being coated with a substance capable of making

said eye a nontransparent, light diffusing surface for said creating of said projected grid pattern onto said eye,

electronic camera means carried by said frame and arranged generally in a second pathway in line with said eye and in a different positional plane from that of said grid means for obtaining and producing an image of said grid pattern projected onto said eye whereby said image of said projected grid pattern on said eye is taken directly from the surface of said eye,

said frame having a main body portion, a centerline, and a first and second arm means each extending outwardly from and on opposite sides of said centerline of said frame,

said first and second arm means including means for carrying said light projection means and said grid means on one side of said center line and said camera means on the other side of said centerline and whereby said first and said second pathways converge onto the surface of said eye at an angle relative to said centerline, whereby said grid is projected onto said eye at a first angle relative to said centerline and is imaged off of the surface of said eye at a second angle relative to said centerline; and

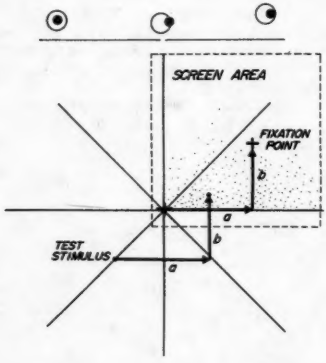
processing means operatively connected to said electronic camera means for instantaneously obtaining data from said image of said grid pattern projected onto said eye for producing quantitative and qualitative analyses of the contour of the entire surface of said eye.

4,995,717

DEVICE FOR MOVING EYE CAMPIMETRY

Bertil E. Damato, Glasgow, Scotland, assignor to The University Court of the University of Glasgow, Glasgow, Scotland

Filed Aug. 22, 1989, Ser. No. 397,139
Int. Cl.[5] A61B *3/02*
U.S. Cl. 351—224 **9 Claims**



1. An oculoperimetric device for use in measuring the field of vision of a patient, which comprises

an extended area visual target having a plurality of discrete localised target elements disposed adjacent a reference target element at a plurality of different angular and radial positions relative to the reference target;

means for moving the visual target in a two-dimensional plane so as to keep the patient's attention fixed on the moving reference target element;

follower means movable by the patient to follow the movement of the reference target element;

localised target elements being visible or invisible to the patient, and each target element appearing visibly at least once during a test sequence;

monitoring means operable by the patient dependent on whether or not he sees the appearance of each individual target element as it becomes visible; and

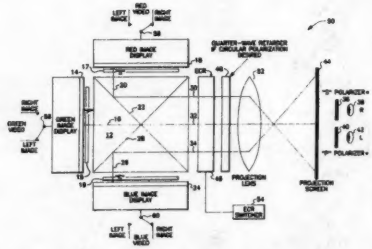
recording means for recording whether or not each target element is seen by the patient, such as to provide a map of the patient's effective field of vision.

4,995,718

FULL COLOR THREE-DIMENSIONAL PROJECTION DISPLAY

Karen E. Jachimowicz, Goodyear, and Ronald S. Gold, Scottsdale, both of Ariz., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 15, 1989, Ser. No. 437,488
Int. Cl.[5] G02B *27/28, 27/22*
U.S. Cl. 353—31 **27 Claims**



1. A full-color, three-dimensional single display comprising:

first source means for providing a first light of first imagery having a first color and a first polarization;

second source means for providing a second light of second imagery having a second color and a second polarization;

combining means for combining the first and second lights into a third light;

projection means for projecting the third light on display means;

polarization switching means, situated between said source means and said display means, for switching the first polarization to the second polarization and for switching the second polarization to the first polarization;

first source switching means, connected to said first source means and to said polarization switching means, for switching the first imagery to the second imagery and vice versa coinciding with the switching of said polarization switching means; and

second source switching means, connected to said second source means and to said polarization switching means, for switching the second imagery to the first imagery and vice versa coinciding with the switching of said first source switching means;

wherein:

a viewer looking at said display means with one eye through a first lens having the first polarization and looking at said display means with another eye through a second lens having the second polarization, is enabled to see full-color, three-dimensional third imagery composed of the first and second imageries.

4,995,719

METHOD OF AND AN APPARATUS FOR PROJECTING A SCANNED TWO- OR THREE-DIMENSIONAL MODULATED LIGHT PATTERN ORIGINATING FROM A LIGHT SOURCE

Ian A. Shanks, Penn, England, assignor to Thorn EMI plc, London, England

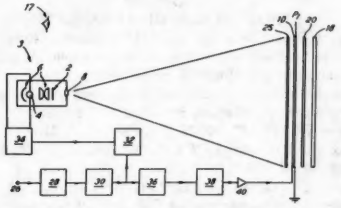
Filed Oct. 4, 1989, Ser. No. 416,770
Claims priority, application United Kingdom, Oct. 6, 1988, 8823490
Int. Cl.[5] G03B *21/00*
U.S. Cl. 353—122 **22 Claims**

1. A method of projecting a scanned two- or three-dimen-

sional modulated light pattern originating from a light source and represented by a matrix of pixels, the method comprising the steps of:

projecting said pattern onto a defined surface distant from the light source;

operating a plurality of means for modulating light between at least a first mode and a second mode, each of the modulating means being associated with a plurality of pixels; wherein the scanning of the matrix of pixels and the operation of said plurality of modulating means are synchro-



nised so that (a) a respective said modulating means is in said first mode when its associated plurality of pixels are being scanned and (b) a respective plurality of pixels are not being scanned when its associated said modulating means is in said second mode;

and each of said modulating means in said first mode allows light to be distributed from said defined surface and each of said modulating means in said second mode allows the effect produced by any light incident on said defined surface to be reduced.

4,995,720

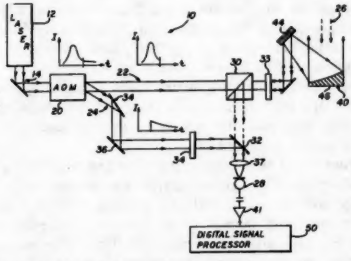
PULSED COHERENT DOPPLER LASER RADAR

Farzin Amzajerdian, Newbury Park, Calif., assignor to Litton Systems, Inc., Woodland Hills, Calif.

Filed Dec. 12, 1989, Ser. No. 449,975

Int. Cl.[5] G01C *3/08;* G01P *3/36*

U.S. Cl. 356—5 **12 Claims**



1. A laser radar apparatus comprising:

a source of propagating coherent wave energy, said energy having a high intensity pulse portion and a substantially lower intensity trailing tail portion;

a switching device upon which said energy is incident wherein substantially all of said pulse portion is directed along a first propagation path toward a target and substantially all of the energy of said tail portion is directed along a second propagation path, said target reflecting said pulse portion as a received signal; and

a detector upon which each of said received signal and said tail portion is incident to determine the Doppler shift of said received signal with respect to said tail portion.

4,995,721

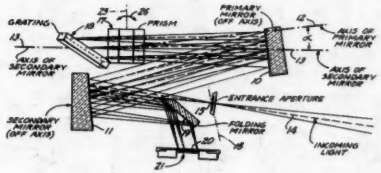
TWO-DIMENSIONAL SPECTROMETER

Robert J. Krupa, Leominster, and R. Calvin Owen, Lincoln, both of Mass., assignors to Imo Industries, Inc., Princeton, N.J.

Filed Mar. 5, 1990, Ser. No. 488,293

Int. Cl.[5] G01J *3/18, 3/36*

U.S. Cl. 356—305 **21 Claims**



1. A two-dimensional spectrometer, having an entrance aperture for admission of light along an optical path to a primary mirror via a secondary mirror, and for reflection as a collimated-light beam from said primary mirror to a two-dimensional dispersive optical device effectively normal to the collimated beam, said dispersive optical device producing a reflected cross-dispersed beam back via said primary and secondary mirrors to a focal plane which effectively includes said entrance aperture, and a two-dimensional detector array in said focal plane and with at least some of its detector elements optically adjacent said optical path and optically facing back-reflected two-dimensionally dispersed light.

4,995,722

SYSTEM FOR ASSISTING HOVERING AIRCRAFT TO LAND ON THE PLATFORM OF A VESSEL

Laurent Sutour, Victor Hugo Hauts De Seine, France, assignor to Societe Anonyme De Telecommunications, Paris, France

Filed Sep. 13, 1989, Ser. No. 406,537

Claims priority, application France, Sep. 14, 1988, 88 11962

Int. Cl.[5] G01B *11/26;* G01C *1/00*

U.S. Cl. 356—152 **9 Claims**

1. A system for assisting the landing, in its final stage, of a hovering aircraft on the platform of a vessel, comprising:

emitting means on said aircraft for emitting a conical beam;

sensitive means on said platform for being sensitive to the cross-section of said conical beam on said platform;

determining means on said vessel for determining said cross-section with respect to a reference on said platform from said sensitive means and determining landing data for said aircraft from said cross-section; and

display means on said vessel for displaying the landing data from said determining means.

4,995,723

METHOD AND APPARATUS FOR OPTICALLY COUPLING AN ELEMENT ANALYSIS SYSTEM AND A LASER TO LIQUID METAL IN A MELTING VESSEL

Christoph Carlhoff, Willich; Claus-Jürgen Lorenzen, Essen, and Klaus-Peter Nick, Achim, all of Fed. Rep. of Germany, assignors to Fried. Krupp Gesellschaft Mit Beschränkter Haftung, Essen, Fed. Rep. of Germany

Filed Sep. 29, 1989, Ser. No. 414,387

Claims priority, application Fed. Rep. of Germany, Oct. 3, 1988, 3833621

Int. Cl.[5] G01J *3/443;* G01N *21/63*

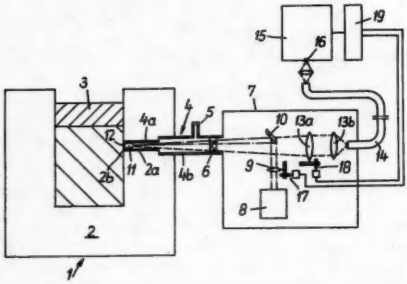
U.S. Cl. 356—318 **7 Claims**

1. A method of analyzing elements of a metal melt contained in a melting vessel, comprising the following steps:

(a) introducing an inert gas at a temperature in excess of 300° C. laterally into a tube passing through a lateral wall of the melting vessel and opening thereinto;

(b) generating a laser beam;

(c) passing the laser beam through an adjustable first lens system;
(d) reflecting the laser beam by a mirror into said tube through a quartz window closing said tube;
(e) generating a plasma in said tube by focusing the laser beam by said adjustable first lens system onto the surface of the metal melt in said tube by the condition that the relation of the intensities Me_I/Me_{II} is a minimum;



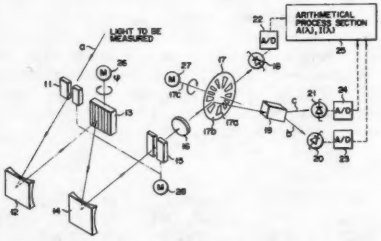
(f) guiding the light generated by the plasma through said quartz window to an adjustable second lens system;
(g) coupling the light by said second lens system with an optical waveguide so that the plasma is focused on the input end of the waveguide; and
(h) introducing the light by the optical waveguide into a spectrometer.

4,995,724

OPTICAL SPECTRUM ANALYZER WITH HIGH PERFORMANCE MEASUREMENT FUNCTION

Yoji Sonobe, Machida, and Takao Tanimoto, Sagamihara, both of Japan, assignors to Anritsu Corporation, Tokyo, Japan

Filed Aug. 14, 1989, Ser. No. 393,805
Claims priority, application Japan, Aug. 18, 1988, 63-205027; Jul. 28, 1989, 1-194057
Int. Cl.[5] G01J *3/18, 3/32*
U.S. Cl. 356—319 **15 Claims**



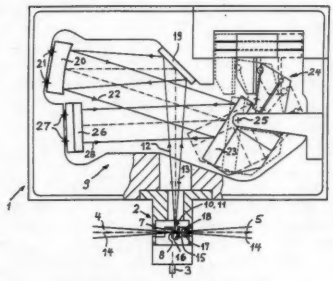
1. An optical spectrum analyzer comprising:
spectroscope means of the dispersion type for receiving light to be measured and emitting it as dispersed light which corresponds to each of wavelengths to be measured;
optical-path switching means for directing the dispersed light emitted from the spectroscope means to pass through first and second paths;
first photoelectric converter means for receiving the light which is directed to pass through the first path by the optical-path switching means;
polarizing/separating means for polarizing and separating the light, which is directed to pass through the second path by the optical-path switching means, into two polarized lights;
second and third photoelectric converter means for respectively receiving the two polarized lights polarized and separated by the polarizing/separating means; and
arithmetical process means for correcting a first optical spectrum strength according to an output from said first photoelectric converter means with at least a ratio of second and third optical spectrum strengths according to outputs from said second and third photoelectric converter means, to thereby calculate absolute spectrum values of the measured light at every wavelength of the light to be measured.

4,995,725

MONOCHROMATOR ARRANGEMENT

Wolfgang Riedel, Neuenburg; Manfred Knothe; Roland Grisar, both of Freiburg; Helmut Wolf, Merzhausen, all of Fed. Rep. of Germany, and Horst M. Preier, Acton, Mass., assignors to Fraunhofer-Gesellschaft zur Forderung der Angewandten Forshung E.V., Munich, Fed. Rep. of Germany

PCT No. PCT/DE87/00528, § 371 Date Jul. 21, 1988, § 102(e) Date Jul. 21, 1988, PCT Pub. No. WO88/04036, PCT Pub. Date Jun. 2, 1988
PCT Filed Nov. 19, 1987, Ser. No. 237,735
Claims priority, application Fed. Rep. of Germany, Nov. 24, 1986, 3640044
Int. Cl.[5] G01J *3/18*
U.S. Cl. 356—334 **19 Claims**



1. A monochromator apparatus comprising:
a monochromator;
an entrance aperture defining an entrance focus for said apparatus, said entrance aperture located on a first axis which defines the direction of propagation of light rays entering said entrance aperture, said entering light rays defining a first intermediate focus;
an exit aperture defining an exit focus for said apparatus, said exit aperture defining a second axis which is abaxially offset from said first axis by a lateral distance;
a diffraction grid; and
a plurality of reversing mirrors for intercepting light rays which pass through said entrance aperture and for reflecting said rays onto said grid from said through said exit aperture and from the exit aperture to the exit of said monochromator apparatus, said light rays exiting said monochromator apparatus defining a second intermediate focus at the location of said first intermediate focus.

4,995,726

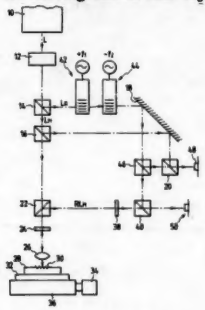
SURFACE PROFILE MEASURING DEVICE UTILIZING OPTICAL HETERODYNE INTERFERENCE

Kazuhiko Fujita, Nagoya, and Yoshinori Bessho, Age, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Sep. 25, 1989, Ser. No. 412,164
Claims priority, application Japan, Sep. 26, 1988, 63-239941
Int. Cl.[5] G01B *9/02*
U.S. Cl. 356—349 **8 Claims**

1. A surface profile measuring device utilizing optical heterodyne interference, comprising:

a laser source for emitting a laser beam;
an object lens for converging the laser beam on the surface of an object to be measured, the laser beam being reflected from the surface of the object while provided with information on a surface profile of the object;
interfering means for allowing the reflected beam from the surface of the object to interfere with a reference beam having a frequency different from that of the reflected beam to form a composite beam of the reflected and reference beams;
driving means for moving one of said object lens and the



object relatively to the other in the direction of the optical axis of the laser beam incident on the surface of the object;
control means for generating a beat signal having the information of the surface profile of the object from the composite beam and controlling said driving means on the basis of the beat signal so that the surface of the object is disposed substantially at a focusing position of said object lens;
surface profile measuring means for measuring the surface profile of the object on the basis of phase variation of the beat signal.

4,995,727

COMPACT DIFFUSION LIGHT MIXING BOX AND COLORIMETER

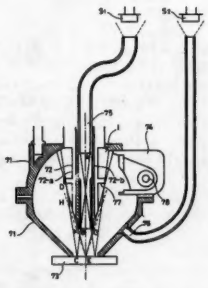
Nobukazu Kawagoe; Masami Sugiyama, and Masahito Inaba, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 19, 1988, Ser. No. 195,962

Claims priority, application Japan, May 22, 1987, 62-125365; May 30, 1987, 62-137458; Jun. 5, 1987, 62-141041; Jun. 5, 1987, 62-141042

Int. Cl.[5] G01J *3/51, 1/18*

U.S. Cl. 356—402 **11 Claims**



1. A colorimeter for measuring color of a sample, comprising:
a light source;
a mixing box formed of a non-coated light diffusing surface by molding.sintering white ceramics or white resin for diffusing and reflecting light from said light source to guide the same to said sample;
first light receiving means for receiving light reflected from the sample when light is emitted from said light source; and
second light receiving means for receiving light other than the light directly reflected from the sample when light is emitted from said light source.

4,995,728

CONFIGURATION WITH SEVERAL SPLICING MODULES

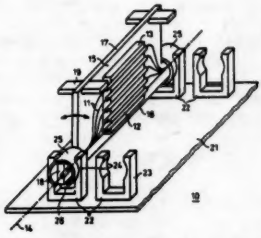
Lothar Finzel, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Dec. 6, 1989, Ser. No. 446,926

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1988, 3842904

Int. Cl.[5] G02B *6/38*

U.S. Cl. 350—96.21 **20 Claims**



1. A configuration of light waveguide splicing modules comprising:
(a) a plurality of individually accessible splicing modules;
(b) a plurality of light waveguide connectors deposited on each of said modules;
(c) at least one light waveguide bundle containing a plurality of light waveguides leading to each splicing module, with the light waveguides of said bundles held in said connectors;
(d) a carrier; and
(e) a pivotable connection pivotally supporting each splicing module individually on said carrier along a pivoting axis which extends through the interior of the splicing module and is parallel to the direction of introduction of the light waveguide bundle into the splicing module, the site on which said light waveguide bundle enters into each of said splicing modules lying on the pivoting axis of said splicing module, the pivoting axes of said plurality of splicing modules extending parallel to each other.

4,995,729

MIXING DEVICE FOR MORTAR

Kurt Eberhardt, Bad Hersfeld, and Reinhold Nibrig, Heringen, both of Fed. Rep. of Germany, assignors to Babcock-BSH Aktiengesellschaft, vormals Büttner-Schilde-Haas AG, Krefeld, Fed. Rep. of Germany

Filed Aug. 23, 1988, Ser. No. 235,343

Claims priority, application Fed. Rep. of Germany, Sep. 2, 1987, 8711865; Sep. 2, 1987, 3729233

Int. Cl.[5] B01C *7/22*

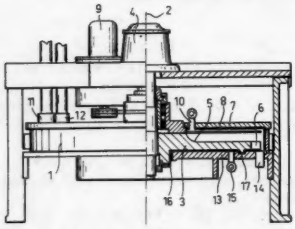
U.S. Cl. 366—2 **9 Claims**

9. A mixer comprising:
a cylindrical housing having a vertical housing axis and a top cover;
a rotating disk in said housing, rotatable about said axis;
teeth around a periphery of said disk;
at least one water inlet in said top cover of said housing;

at least one inlet for solid material in said top cover of said housing;

at least one outlet for mixed material in a floor of said housing and near said periphery of said housing, said outlet being located below said teeth;

at least one water inlet in a floor of said housing and within a region defined by said teeth; and



an annular constriction of a clearance between said disk and said floor of said housing, said constriction being formed by an annular groove in said floor and by a ring located on an underside of said rotating disk, said ring penetrating into said annular groove, said constriction being between said water inlet in said floor of said housing and said teeth, said water inlet in said floor of said housing and said constriction providing means for keeping an underside of said disk under constant pressure of flowing water.

4,995,730

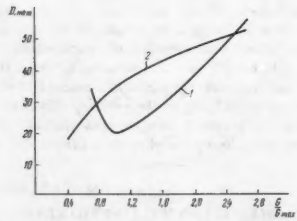
METHOD OF ELECTROMAGNETIC WORKING OF MATERIALS

Vladimir A. Abrosimov, ulitsa Krasnoborskaya, 1a, kv. 43; Viktor F. Luzev, ulitsa I Zhilaya, 14, kv. 6.; Vladimir N. Lyapunov, ulitsa Sovetskaya, 57, kv. 138., all of Yaroslavl; Jury N. Kuznetsov, Kashirskoe shosse, 142, korpus 3, kv. 279., Moscow; Vladimir B. Manerov, ulitsa Respublikanskaya, 77, kv. 110., Yaroslavl, and Leon M. Skuinsh, ulitsa Tereshkovoi, 35b, kv. 7., Riga, all of U.S.S.R.

Filed Dec. 22, 1988, Ser. No. 288,235

Int. Cl.[5] B01F *13/08*

U.S. Cl. 366—273 **2 Claims**



1. A method of electromagnetic working of materials, including:

providing a working zone having an uppermost part and a lowermost part;

producing a variable magnetic field in said working zone;

placing in said working zone a layer of magnetic elements capable of moving chaotically under the action thereupon of said variable magnetic field and measuring a maximum active power consumed by said layer of the chaotically moving magnetic elements;

feeding a continuous stream of a material into said working zone from below upward through said layer of magnetic elements, for said stream of the material to be worked by said magnetic elements; and

maintaining the feed rate of said stream of the material within a range from 0.8 to 2.5 of the feed rate corresponding to the maximum active power consumed by said layer of chaotically moving magnetic elements.

4,995,731

METHOD FOR MEASURING HEAT TRANSFER COEFFICIENT AND SENSOR INCLUDING HEAT TRANSFER ELEMENT AND THERMAL INSULATION ELEMENT

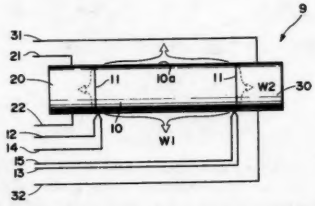
Tomoshige Hori, Kitamoto, and Kensuke Itoh, Kodaira, both of Japan, assignors to Snow Brand Milk Products Co., Ltd., Japan

Filed Feb. 18, 1988, Ser. No. 157,260

Claims priority, application Japan, Mar. 3, 1987, 62-48566; Mar. 4, 1987, 62-49372

Int. Cl.[5] G01N *25/20*

U.S. Cl. 374—43 **7 Claims**



1. In a method for measuring a heat transfer coefficient between a heat transfer element and a fluid body wherein a calorific value is measured by placing the heat transfer element into said fluid body and charging the heat transfer element with an electric current so as to measure said calorific value, the improvement wherein a measured calorific value is the true calorific value of the entire heat transfer element by heat-transferably contacting a particular surface of said heat transfer element with said fluid body and measuring the calorific value of that particular surface and by rendering the residual surface of said heat transfer element in a thermal insulation state.

4. A sensor comprising a combination of a heat transfer element and a thermal insulation element wherein the said heat transfer element has a particular surface which is heat-transferably contacted with a fluid and said thermal insulation element is a residual surface of said heat transfer element, and means for holding the temperature of said thermal insulation element substantially equal to the temperature of an interface of the said heat transfer element and the said thermal insulation element such that heat cannot be transferred between said heat transfer element and said thermal insulation element.

4,995,732

METHOD AND APPARATUS FOR CONTINUOUS MEASUREMENT OF THE TEMPERATURE OF ELECTROCONDUCTIVE MELT AND THE THICKNESS OF REFRACTORY LINING

Nikola A. Lingorski; Mincho B. Hadjiiski; Rumen B. Yovchev; Kamen B. Spassov, and Peter H. Savov, all of Sofia, Bulgaria, assignors to Nis Pri Vissh Chimikotechnologiches Ki Institut, Sofia, Bulgaria

Continuation of Ser. No. 370,232, Jun. 22, 1989, abandoned. This application Jun. 8, 1990, Ser. No. 535,975

Int. Cl.[5] G01K *1/12*

U.S. Cl. 374—139 **3 Claims**

3. An apparatus for measuring the temperature of an electroconductive melt and thickness of a refractory lining of a vessel containing said melt, comprising:

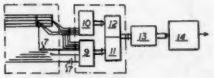
a temperature indicator disposed in a refractory lining of a vessel containing an electroconductive melt, said temperature indicator being formed by a plurality of elongated

heat-conductive bodies arranged in an array and having ends wetted by said melt;

a pair of plates disposed transverse to said heat-conductive bodies and traversing and contacting said array at a fixed distance from one another beyond a melt-consumable portion of said bodies;

a thermoelectric sensor provided on each of said plates and connected to a computer for determining the melt temperature; and

a thickness indicator disposed in said refractory lining, said thickness indicator being formed by a plurality of elongated electroconductive bodies having ends facing



towards said melt and each differing from a preceding end by a fixed constant distance, a longest body of said electroconductive bodies having an end wetted by said melt, said longest body being connected to one pole of a current source, so that as the electroconductive melt erodes said refractory lining, additional ends of said electroconductive bodies become wetted by said melt, establishing an electrical connection between said longest body and the additional exposed bodies, whereby when a connection is provided between another pole of said current source and a contact end of said additional bodies, a closed circuit is established, providing a measurement of the thickness of said refractory lining.

4,995,733

MEASUREMENT SENSOR FOR THE DETECTION OF TEMPERATURES IN METAL OR ALLOY MELTS

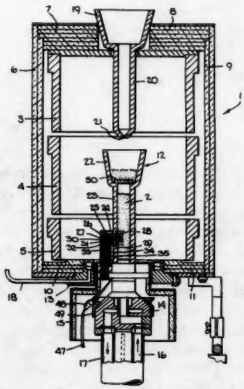
Friedrich-Werner Thomas, Gelnhausen; Jürgen Schädlich-Stubenrauch, and Alfred Hediger, both of Aachen, all of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Hanau, Fed. Rep. of Germany

Continuation of Ser. No. 193,770, May 13, 1988, abandoned. This application Dec. 13, 1989, Ser. No. 453,101

Claims priority, application Fed. Rep. of Germany, May 14, 1988, 3716145

Int. Cl.[5] G01K *7/04, 1/08;* **H01L** *35/02*

U.S. Cl. 374—140 **4 Claims**



1. The combination of a vacuum furnace and a measurement sensor for the detection of temperatures in metal or alloy melts disposed in a casting mold, comprising: several graphite heating devices, a sprue, a casting dish, insulation surrounding the graphite heating devices, a cooling head provided below the casting dish into which latter said measurement sensor is built, and said measurement sensor comprising a thermocouple having two wire legs and a weld bead at a connection of these legs, and having a high heat-resistant thermal sheath surrounding the thermocouple, the weld bead of the thermocouple being disposed in the direct vicinity of one end of the sheath, the one end being a blind bore sealed with a SiO_2-free filler material exposed directly to the melt outside the sheath, the one end of the sheath being introduced directly into the melt while a second end of the sheath is in connection with a holding means.

4,995,734

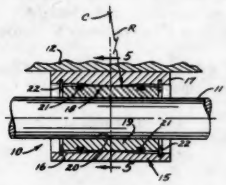
PILLOW BLOCK HOUSING FOR A SHAFT-SUPPORTING BEARING

Robert Schroeder, Rockford, Ill., assignor to Pacific Bearing Co., Rockford, Ill.

Filed Apr. 6, 1990, Ser. No. 505,829

Int. Cl.[5] F16C *23/04, 29/12*

U.S. Cl. 384—38 **4 Claims**



1. The combination of, a shaft having a central longitudinal axis, a bearing for supporting said shaft, and a housing for supporting said bearing, said bearing being of circular cross-section and having a predetermined outer diameter, said bearing having an outer surface which is circumferentially continuous through 360 degrees around said axis, said housing having a bore which receives said bearing, said bore being of circular cross-section, being circumferentially continuous for 360 degrees around said axis and having, in a predetermined radial plane, a diameter which closely approximates the outer diameter of said bearing, the diameter of said bore increasing progressively and symmetrically as said bore proceeds axially a predetermined distance from each side of said plane whereby said bearing may rock within said bore to enable the axis of said shaft to assume a position which is inclined angularly relative to the axis of said bore.

4,995,735

CONTOURED JOURNAL BEARING

Terence J. Dansdill, 12 Wilson St., Beverly, Mass. 01915

Filed Dec. 22, 1988, Ser. No. 288,745

Int. Cl.[5] F16C *23/02, 17/02*

U.S. Cl. 384—276 **9 Claims**

1. An improved journal bearing adapted for use in lubricated gear trains under loads sufficient to bend the rotor which is rotatably supported within said bearing comprising:

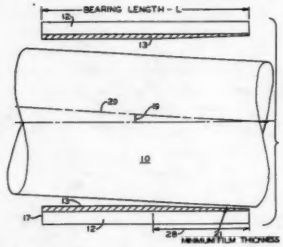
a bearing shell;

a non-resilient babbitt lining supported within said bearing shell and interposed between said bearing shell and said rotor;

the external surface of said lining being of uniform diameter and in contact with said bearing shell to prevent movement of said lining within said bearing shell;

a portion of the internal surface of said babbitt lining being contoured under no load in a direction along the axis of said rotor and said bearing to conform more closely to the contour of said rotor under load;

the slope and length of said contour being adequate to maintain an acceptable minimum lubrication film thickness of



said bearing with said rotor over the load profile of said rotor.

4,995,736

RADIAL ROLLING BEARINGS

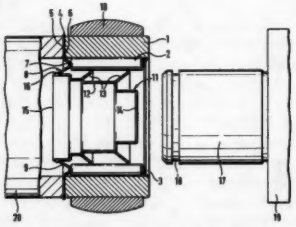
Henry Haase, Leichlingen; Joachim Schneider, Dusseldorf, both of Fed. Rep. of Germany, and Pierre Alber, Reichshoffen, France, assignors to INA Walzlager Schaeffler KG, Fed. Rep. of Germany

Filed May 23, 1990, Ser. No. 528,032

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1989, 3923111

Int. Cl.[5] F16C *41/04*

U.S. Cl. 384—448 **10 Claims**



1. A radial rolling bearing comprising an outer ring in whose bore a set of cylindrical rolling elements is arranged, the rolling elements being retained from falling out inwards by an elastic retaining element inserted into the bore of the bearing and stop flanges being provided at both front faces of the rolling elements for their axial fixing, characterized in that at least one of the stop flanges is formed by a detached flanged disc which is retained in its position by an elastic element.

4,995,737

AXIAL ANTI-FRICTION BEARING

Rainer Moller, Schweinfurt; Manfred Pretscher, Meine, and Anton Schmidt, Hassfurt, all of Fed. Rep. of Germany, assignors to FAG Kugelfischer Georg Schafer (KGaA), Fed. Rep. of Germany

Filed May 10, 1990, Ser. No. 521,609

Claims priority, application Fed. Rep. of Germany, May 23, 1989, 8906357[U]

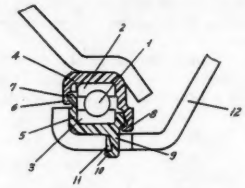
Int. Cl.[5] F16C *33/76, 19/30*

U.S. Cl. 384—607 **8 Claims**

1. An axial anti-friction bearing for the rotatable mounting of a spring pad in the shock-absorber leg of a wheel, the bearing comprising:

first and second axially separated, annular races and a plurality of rolling bodies disposed between the races;

a respective annular cap comprised of plastic material holds each of the races; each cap including a respective cooperating holding nose for cooperating with a holding nose on the other cap for snapping the caps together in sliding and sealing manner, thereby for holding the races in position to guide the rolling bodies between the races;



at least one pin protruding approximately axially of the bearing from at least one of the caps, a respective projection provided on the pin for engaging into and then locking behind a cutout in a spring plate to which the bearing is supported for holding the bearing in snap like manner on the spring plate by means of the pins.

4,995,738

DOCUMENT PROCESSING APPARATUS WITH AUTOMATIC HYPHENATION DURING EDITING

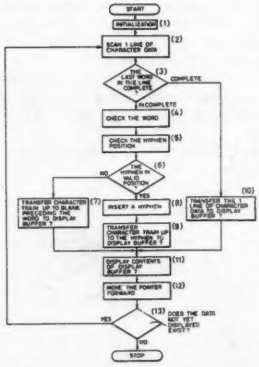
Hideo Shibaoka, c/o Canon Kabushiki Kaisha: 30-2, 3-chome, Shimomaruko, Ohta-ku, Tokyo, Japan

Continuation of Ser. No. 170,357, Mar. 18, 1987, abandoned. This application Nov. 21, 1989, Ser. No. 437,782

Claims priority, application Japan, Mar. 23, 1987, 62-65692; Mar. 23, 1987, 62-65693

Int. Cl.[5] B41B *1/04*

U.S. Cl. 400—7 **8 Claims**


START
INITIALIZATION
SCAN 1 LINE OF CHARACTER DATA
DOES LAST WORD IN THIS LINE COMPLETE?
COMPLETE
INCOMPLETE
CHECK THE WORD
CHECK THE HYPHEN POSITION
IS THIS HYPHEN IN VALID POSITION?
NO
YES
TRANSFER CHARACTER TRAIN UP TO BLANK OR HYPHEN OF WORD TO DISPLAY BUFFER 1
INSERT A HYPHEN
TRANSFER THE 1 LINE OF CHARACTER DATA TO DISPLAY BUFFER 1
TRANSFER CHARACTER TRAIN UP TO THE HYPHEN TO DISPLAY BUFFER 2
DISPLAY CONTENTS OF DISPLAY BUFFER 1
MOVE THE POINTER FORWARD
DOES THE DATA NOT YET HAVE BEEN EXIST?
YES
NO
STOP

1. A document processing apparatus comprising:

memory means for storing document information;

display means for displaying the document information which is stored in said memory means;

display control means for controlling said display means so as to add a hyphen at the end of a line on said display means and to control the display of a word contained in the document information; and

editing means for editing the document information which is displayed by said display means,

wherein said display control means controls said display means in a manner such that when document editing is performed by said editing means, said display control means again controls said display means to add a hyphen at the end of a line on said display means.

4,995,739

TEXT EDITING DEVICE FOR ERASING HYPHENATED WORDS LOCATED ON TWO LINES

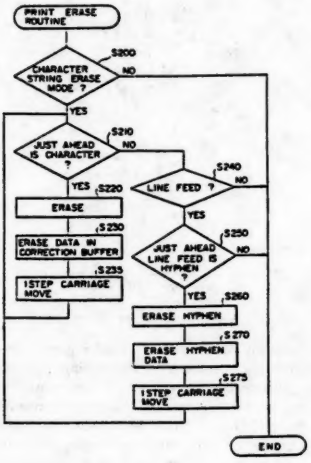
Kelichi Hirata, Kuwana; Yasushi Kawakami, Nagoya; Tomoko Miura, Nagoya; Miyako Mukai, Nagoya; Tomohiro Ban, Iwakura, and Akihiro Furukawa, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

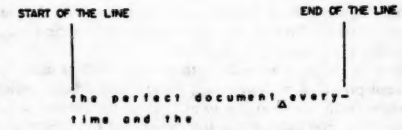
Filed Mar. 15, 1989, Ser. No. 323,971

Claims priority, application Japan, Mar. 16, 1988, 63-62806

Int. Cl.[5] B41J 5/30

U.S. Cl. 400—63 19 Claims





1. A text editing device for erasing with a single keystroke a word formed of a first character string at the end of a text line and a second character string on a following text line, said device comprising input means for inputting character codes and function codes, memory means for storing the codes, represent means for representing characters corresponding to the codes inputted by said input means, designate means for designating a point on a text line, said text line consisting of a plurality of character strings, said text editing device further comprising:

erase means operable by said single only one word by eliminating keystroke for erasing characters of said second character string successively located behind the point designated by said designate means and for further erasing successive characters of said first character string located on a preceding line, in case that a predetermined character is located at the end of said preceding line and just behind the character erased by said erase means; and

eliminate means operable by said same single keystroke for eliminating the character codes corresponding to the characters erased by said erase means and any line feed code stored with the character codes erased by said erase means.

4,995,740

PRINTING DEVICE WITH SPELLING CHECK THAT CONTINUES PRINTING AFTER A DELAY

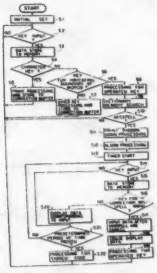
Norio Kobayashi, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Filed Aug. 22, 1989, Ser. No. 397,745

Claims priority, application Japan, Aug. 24, 1988, 63-209713

Int. Cl.[5] B41J 5/30

U.S. Cl. 400—63 9 Claims



1. A printing device comprising input means for inputting character data, print means including a print head member moveable along a print line on a print sheet, for executing print operations through a print ribbon in response to the inputted character data, said printing device further comprises:

dictionary memory means for storing spelling information of a multiplicity of words;

spelling check means for checking the spelling of a character string defined in a predetermined manner and having been printed on said print sheet, by retrieving the words stored in said dictionary memory means;

first control means for controlling said print means so as to cease the print operation in case that a word whose spelling is equal to the character string checked by said spelling check means is not stored in said dictionary memory means;

memory means for storing the data inputted after said print means is so controlled to cease the print operations by said first control means;

count means for counting a period of time after a detection of misspelling of the character string executed by said spelling check means; and

print control means for controlling said print head member so as to execute print operations in response to the data stored in said memory means in case that a value counted by said count reaches a predetermined value.

4,995,741

THERMAL PRINT-TRANSFER RIBBON

Norbert Mecke, Hanover, and Heinrich Krauter, Neustadt, both of Fed. Rep. of Germany, assignors to Pelikan Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Filed Nov. 16, 1988, Ser. No. 272,599

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1987, 3738934

Int. Cl.[5] B41J 2/325

U.S. Cl. 400—120 19 Claims

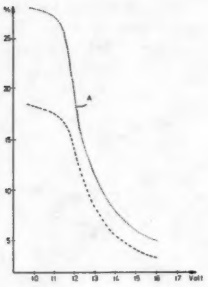
1. A thermal transfer ribbon for use in a thermal transfer process, comprising:

a carrier band;

a transfer layer on one side of said band and composed of a material melting during said process for transfer to a substrate; and

means for reducing relative reflectivity of said transferred melted material to no higher than about 18% per DIN 67 530, said means including an intermediate layer, said intermediate layer disposed between said transfer layer and

said band and being composed of a hydrophilic organic substance which is nonmeltable during said process and



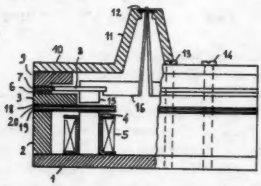
has a greater adhesion to said carrier band than to said transfer layer.

4,995,742

NEEDLE PRINTING HEAD

Sergio Cattaneo, Rho, Italy, assignor to Bull HN Information Systems, Inc., Billerica, Mass.

Filed Oct. 2, 1989, Ser. No. 415,811
Claims priority, application Italy, Oct. 18, 1988, 22341 A/88
Int. Cl.[5] B41J *2/27*
U.S. Cl. 400—124 **2 Claims**



1. A needle printing head of the permanent magnet type, wherein a first circular ring of magnetic material is provided with a plurality of elastic leaves, the leaves extending inwardly toward a central axis of the print head, each leave being provided with a post and forming with said post one cantilever armature of a plurality of armatures for printing actuators, each armature having its post attracted towards a corresponding one of a plurality of magnetic poles magnetized by a permanent magnet, the needle printing head further having an actuator damping element, the magnetic damping element comprising:

first and second metal sheets, and

a resilient film, the resilient film being interposed between between the first and second metal sheets,

the first and second metal sheets and the resilient film being in the form of circular rings having the same outer diameter as the first circular ring and being interposed between the posts of the plurality of armatures and the plurality of magnetic poles,

the first metal sheet being in contact with the poles and continuously in contact with the resilient film, and

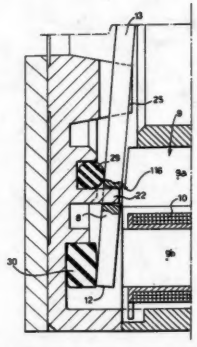
the resilient film being continuously in contact with the second metal sheet.

4,995,743

WIRE PRINTER WITH STEP FORMATION ARMATURE AND METHOD OF ASSEMBLY

Francesco Bernardis, Chiaverano; Claudio Marangon, Borgofranco D'Ivrea, and Rinaldo Ferrarotti, Ivrea, all of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Dec. 27, 1988, Ser. No. 289,840
Claims priority, application Italy, Dec. 29, 1987, 68141 A/87
Int. Cl.[5] B41J *3/12*
U.S. Cl. 400—124 **24 Claims**



1. A method for the manufacture of a printer including a plurality of printing needles, a corresponding plurality of electromagnets with respective excitation conductive wires and movable armatures for selectively pushing the needles during printing, a body for housing the electromagnets, and a mass of bistate material for pouring into the housing body in a liquid state and holding the electromagnets in the housing body in a hardened state, wherein the method includes the steps of:

providing a housing body in the form of a generally cup-shaped body with a mouth part for the introduction of the holding mass and a base wall with apertures for the passage through the base wall of the conductive wires for the excitation of the electromagnets,

providing the housing body with an associated closure element provided with generally tubular appendages which extend into the apertures so as to close the apertures and have internal cavities for the passage of the conductive wires surrounded thereby,

inserting the electromagnets in the housing body, the conductive wires of each electromagnet being made to pass through the respective appendages of the closure element,

pouring the holding mass into the housing body in the liquid state, and

hardening the holding mass.

4,995,744

IMPACT PRINTER ACTUATOR USING MAGNET AND ELECTROMAGNETIC COIL AND METHOD OF MANUFACTURE

Michael P. Goldowsky, Valhalla, N.Y.; Teiji Hisano, Fujisawa, Japan; John P. Karidis, Ossining, N.Y.; Hiromi Shibuya, Fujisawa, and Osamu Ueda, Yokohama, both of Japan, assignors to International Business Machines Corporation, Armonk, N.Y.

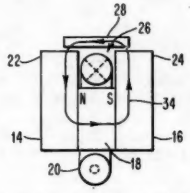
Filed Dec. 16, 1988, Ser. No. 285,203
Int. Cl.[5] B41J *2/28*
U.S. Cl. 400—157.2 **19 Claims**

1. A dot matrix printer actuator comprising:

a print armature;

stator means comprising a stator frame having at least two ferromagnetic poles and at least one permanent magnet, said magnet being located between and separating two of

said poles, said magnet being magnetized in a line along an axis of said stator means and having a relatively small length, measured between said poles on said axis, and a relatively large combined width and height, measured transversely relative to said axis, said poles each extending transversely from said stator means axis beyond said magnet, said poles each having a magnet contact area, which is an area of contact between said poles and said magnet, and an armature contact area, which is an area of contact between said poles and said armature, wherein the magnet



contact area of said poles are relatively larger than the armature contact areas of the poles; and

coil means comprising at least one electromagnetic coil having a coil axis perpendicular to its wind which is parallel to said stator means axis and, said coil substantially surrounding said magnet with at least a portion of said coil being located between said poles whereby said magnet can produce a magnetic flux through said poles to hold said armature and, said coil can be energized to counteract the magnetic flux from said magnet such that said armature can move.

4,995,745

PRINTER WITH MULTI-FUNCTION PAPER FEEDING MECHANISM

Takeshi Yokoi, Kagamigahara; Shigeo Nakamura, and Hiroshi Yamanaka, both of Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

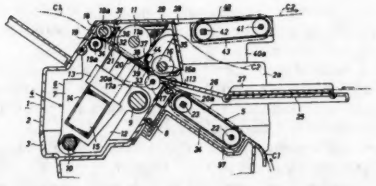
Continuation of Ser. No. 87,827, Aug. 21, 1987, Pat. No. 4,898,488. This application Jul. 31, 1989, Ser. No. 386,692

Claims priority, application Japan, Aug. 22, 1986, 61-197916; Mar. 28, 1987, 62-74980; Apr. 7, 1987, 62-86125

The portion of the term of this patent subsequent to Feb. 6, 2007, has been disclaimed.

Int. Cl.[5] B41J *11/50*

U.S. Cl. 400—605 **22 Claims**



1. A printer comprising a platen, a print head which faces said platen so as to print out on a sheet of printing paper at a printing position on said platen, a paper guide path for guiding the printing paper through said printing position, and a guide means having a guide plane for inserting a sheet of printing paper in said guide path;

wherein said paper guide path comprises a paper inlet portion at one end thereof for inserting the printing paper thereto and a paper discharge portion at the other end thereof for discharging the printing paper therefrom,

said paper guide path is a substantially flat path extending from said paper inlet portion to said paper discharge portion, and

said guide plane of said guide means is connected with said paper inlet portion of said paper guide path and meets said paper guide path at an obtuse angle, and wherein said paper guide path slants upward in the paper feed direction so that said paper inlet portion is located lower than said paper discharge portion, and wherein said print head is located below said platen so as to print on a lower surface of the printing paper in said paper guide path.

4,995,746

OFFICE MACHINE

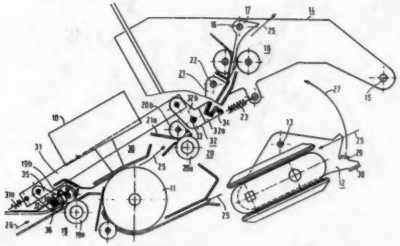
Manfred Rosenthal, Kirchen-Freusburg, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 1, 1989, Ser. No. 317,378

Claims priority, application Fed. Rep. of Germany, Mar. 10, 1988, 3807809

Int. Cl.[5] B41J *11/32*

U.S. Cl. 400—616.2 **10 Claims**



8. Printer apparatus with endless and sheet paper feed modes comprising:

a housing;

a printing unit secured to the housing;

sheet paper transport means comprising a first pair of rollers rotatably secured to the housing in front of the unit and a second pair of rollers rotatably secured to the housing behind the unit relative to a paper print feed path, each said pairs having a pressure applying mode for feeding said sheet paper and a release mode during feed of said endless paper;

an endless paper feed tractor pivotally secured to said housing for pivoting to a paper pull position and a paper push position; and

means coupled to said tractor, said housing and at least one roller of said first pair and one roller of said second pair for selectively placing said rollers in the release mode in response to the placement of the tractor in one of said pull and push positions and in the pressure mode in response to the placement of the tractor in the other of said pull and push positions.

4,995,747

PAPER STACKING APPARATUS FOR OFFICE MACHINES

Günther Engelhardt, Niederstotzingen; Gerhard Lohrmann, Thalfingen, and Thomas Werner, Neu-Ulm, all of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

Filed Aug. 9, 1988, Ser. No. 230,472

Claims priority, application Fed. Rep. of Germany, Aug. 11, 1987, 3727070

Int. Cl.[5] B41J *13/048*

U.S. Cl. 400—625 **19 Claims**

1. A paper stacking apparatus for an office machine, said office machine having a forward end and a rear end and including means for sequentially supplying sheets of paper upwardly

along a generally vertical path, said office machine having opposite sides extending from said forward end to said rear end, said sheets for being disposed transversely in said office machine to extend between said opposite sides of office machine, and said path being located between said front end and said rear end, said paper stacking apparatus comprising:

a support frame rigidly mounted on said office machine;

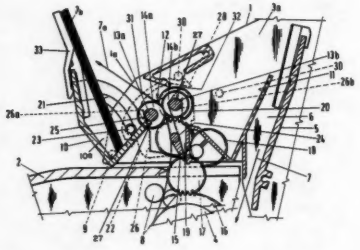
said support frame being located above said means for sequentially supplying said sheets;

a paper guide element pivotally mounted within said support frame in alignment with said path;

a forward stacker pivotally mounted on said support frame forwardly of said paper guide element;

a rear stacker rigidly mounted on said support frame rearwardly of said paper guide element;

said paper guide element being coupled to said forward stacker;



said paper guide element having a forward position and a rear position relative to said support frame;

said paper guide element being coupled to said forward stacker for pivotal movement of said paper guide element relative to said support frame and to said forward stacker between said forward position and said rear position in response to pivotal movement of said forward stacker relative to said support frame;

said forward stacker comprising means for generating pivotal movement of said paper guide element to said forward position for directing said sheets to said forward stacker for forward to rear stacking of said sheets thereon; and

said forward stacker comprising means for generating pivotal movement of said paper guide element to said rear position for directing said sheets to said rear stacker for rear to forward stacking of said sheets thereon.

4,995,748

RECIPROCATING PRINTING CARTRIDGE EXTENDING BEYOND CASING SIDEWALL OPENING

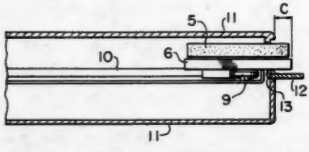
Noriyuki Tajima, Yawata; Shigeto Ueno, Neyagawa, and Tetsuhiro Sano, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 12, 1989, Ser. No. 378,911

Claims priority, application Japan, Jul. 18, 1988, 63-177112

Int. Cl.[5] B41J *29/02*

U.S. Cl. 400—691 **8 Claims**



1. An information processing device comprising a serial printer adapted to effect printing through reciprocating movements of a carriage loaded thereon with a printing head and an ink ribbon cartridge, characterized in that said device further comprises an outer casing having an opening portion at least one side surface thereof, whereby, when said carriage has reached a terminal end of its stroke for reciprocating movements, a part of either one, or both, of said carriage and said ink ribbon cartridge is allowed to project outside said outer casing through said opening portion.

4,995,749

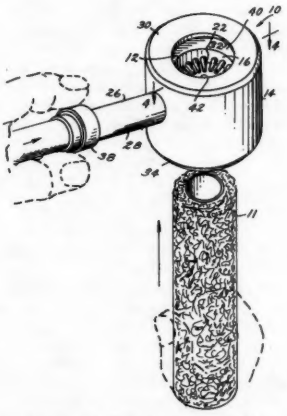
APPARATUS FOR CLEANING A PAINT ROLLER PAD

Robert J. Gornik, 12235 Pacific Ave., #101, Los Angeles, Calif. 90066

Filed Sep. 5, 1989, Ser. No. 402,480

Int. Cl.[5] B08B *3/02*; A46B *17/06*

U.S. Cl. 401—9 **9 Claims**



1. Apparatus for cleaning a paint roller pad of predetermined diameter, said apparatus comprising:

a first hollow annular member defining a hollow interior and having an outer surface and a first inner surface, said inner surface defining a plurality of openings in fluid communication with said hollow interior;

a plurality of nozzle elements projecting inwardly from said inner surface and in fluid communication with said openings;

free ends of said nozzle elements positioned to have an interference fit with the nap of a roller pad around the entire circumference of the pad when the pad is placed between said nozzle elements;

means in operative relationship with said hollow interior for introducing liquid into said interior;

an annular sleeve attached to and in substantially coaxial relationship with said first annular member, said sleeve defining a wiping opening defined by a second inner surface having an interference fit with a roller pad, whereby paint and liquid are wiped and wrung from the roller pad as the pad is passed through said sleeve after contact with said nozzle elements; and

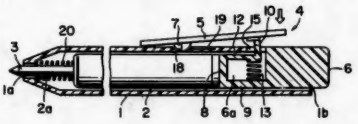
a second annular member attached to and in substantially coaxial relationship with said first member for reducing and controlling the amount of spray and splashing of liquid and paint as the roller pad is passed through said apparatus.

4,995,750

CLIP-OPERATED RETRACTION MECHANISM

Yukihiro Akita, Honjo, Japan, assignor to Kabushiki Kaisha Pilot, Tokyo, Japan

Filed Apr. 26, 1990, Ser. No. 515,099
Claims priority, application Japan, Nov. 24, 1989, 64-136377; Jan. 17, 1990, 65-2994
Int. Cl.[5] B43K *24/04, 24/08, 25/00, 7/12*
U.S. Cl. 401—104 12 Claims



1. A retraction mechanism for a retractable-tip writing instrument of the type having a reservoir which is mounted within a substantially tubular body for movement between a writing and a retracted position and which is sprung with respect to the body from the writing toward the retracted position, the retraction mechanism comprising:

(a) a push button affixed to the reservoir for joint movement therewith between the writing and the retracted position relative to the body;

(b) a cantilever of resilient material secured at one end to the push button and extending longitudinally of the body;

(c) a fulcrum formed on another end of the cantilever and extending through a clearance slot formed longitudinally in the body;

(d) a pocket clip formed on the fulcrum and disposed outside the body; and

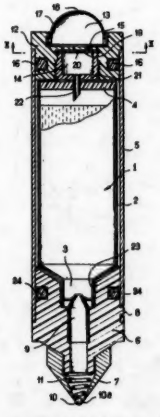
(e) a catch formed on the pocket clip and urged against the body by virtue of the resiliency of the cantilever, the catch being capable of positive engagement with the body when the push button is pressed to move the reservoir form the retracted to the writing position.

4,995,751

DEVICE FOR APPLYING A LIQUID OR SEMI-PASTE SUBSTANCE ON A SURFACE

Bertrand Saint Georges Chaumet, 41 Avenue du Chesnay, 78170 La Celle Saint Cloud, France

Filed Oct. 27, 1988, Ser. No. 263,184
Claims priority, application France, Nov. 6, 1987, 87 15439
Int. Cl.[5] B43K *5/14*
U.S. Cl. 401—135 7 Claims



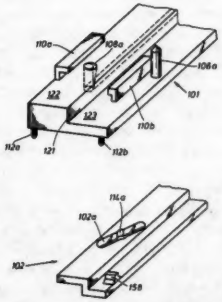
1. A device for applying a liquid or semi-paste substance on a surface, comprising a hermetically sealed refill (1), containing said substrate and removably disposed within a body (5) which is intended to be manipulated by hand, said device having at one end a head (7) for application of said substance which is removably fixed at said end, means (9) for putting said application head (7) into communication with the interior of the refill (1), said application head having means (10, 11) for preventing discharge of the substance as long as said head is not applied on the surface, the other end of the body (5) having closure means (12), the refill (1) being sealed-off at its end remote from the application head (7) by a capsule (4) of perforatable material, said closure means (12) for the body (5) carrying a hollow needle (22) which is capable of perforating said capsule (4), said capsule (4) being made from a material such that a leak-tight sealing is provided when it is perforated by said needle when the refill is placed within said body (5), said hollow needle (22) communicating with air pressurization mans (17) which can be actuated by hand and which is carried by said closure means (12), means (19, 20) for closing the communication between the hollow needle (22) and said pressurization means after release of said pressurization means, said pressurization means comprising a manually-actuated mini-pump (17) having a non-return valve (19), said mini-pump generating and maintaining on the downstream side of said valve (19) air under pressure to ensure good flow of the substance, there being a cavity (14) between the non-return valve (19) and the hollow needle (22), said non-return valve (19) being constituted by a resilient washer having a small slit and a periphery, said cavity (14) having a bottom provided with a hole (15) communicating with said mini-pump (17), said washer being applied against said bottom, said hollow needle (22) being mounted in a hollow needle-holder (21) which is screwed into said cavity (14), said hollow needle-holder (21) having a circular end lip applied against the periphery of said washer.

4,995,752

ORDERING MEANS FOR DOCUMENT FILES OR THE LIKE

Jörg Hofmann, Kreuzwertheim, Fed. Rep. of Germany, assignor to Gudrun Hofmann and Raimund Hofmann, both of Kreuzwertheim, Fed. Rep. of Germany

Continuation of Ser. No. 173,974, Mar. 28, 1988, Pat. No. 4,948,286. This application Dec. 7, 1989, Ser. No. 447,953
Int. Cl.[5] B42F *13/24*
U.S. Cl. 402—34 17 Claims



1. A filing device for document files comprising:

a base plate having at least two stationary sheet retainers projecting from the base plate;

said base plate further having movable sheet retainers being engaged with said base plate;

said base plate further comprising a guide passage being an integral part of said base plate for receiving a locking member and for allowing movement of the locking mem-

ber with respect to the base plate along two moving directions being opposite to each other;

said guide passage being formed by horizontally offset guiding rails vertically projecting from said base plate;

said locking member being movably arranged above the base plate;

wherein the movable sheet retainers are pivotably supported by said base plate and are pivotably inserted into openings of the base plate such that they are vertically projecting from the base plate;

said locking member having guide slots being inclined with respect to said moving direction and being directly engaged with said movable sheet retainer such that movement of the locking member along said guiding rails opens and closes the movable sheet retainers, whereat the axis of rotation of the movable sheet retainers is arranged along the moving direction of the locking member;

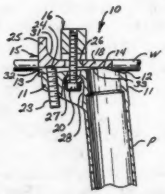
wherein the base plate is plastic and is provided with openings for inserting said movable sheet retainers.

4,995,753

SADDLE SUPPORT FOR BICYCLES, MOTORCYCLES, AND THE LIKE

William B. Shook, Bremen, Ohio, assignor to Thurston, Inc., Columbus, Ohio

Filed Jul. 27, 1990, Ser. No. 560,066
Int. Cl.[5] F16D *1/00*
U.S. Cl. 403—24 **7 Claims**



1. A saddle support for bicycles or the like adapted to support a saddle on the upper end of a bicycle frame support post of tubular form comprising a pair of clamping members adapted to grip the wires of the saddle and maintain them in their original relationship, said pair of clamping members including an upper clamping member and a lower cradle support member having a pair of cradles for receiving the wires, said upper member engaging the wires and clamping them in the cradles, said lower cradle support having a downwardly-opening post-receiving socket extending linearly forwardly and rearwardly thereof, said socket having a flat inner wall, a transverse fulcrum formed on said post at its upper end engaging said flat wall, and said socket having forwardly and rearwardly linearly extending side walls which are at sharp angles to the said flat inner wall for cooperating with the sides of the post at said fulcrum to prevent transverse shifting thereof, and means for tilting said lower support member about said fulcrum to thereby tilt the saddle forwardly or rearwardly, said linearly extending side walls of the socket being at obtuse angles relative to the flat inner wall, said upper clamping member being extruded to form a body with depending laterally spaced lugs which engage said wires and hold them in said cradles of said lower member, said means for tilting said lower support comprises a screw carried by the upper end of the post for engaging the flat inner wall of the socket to move it about said fulcrum,

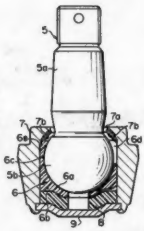
and a bolt carried by the upper end of the post which clamps the upper and lower members together and holds the lower member in contact with said fulcrum for tilting movement.

4,995,754

BALL-AND-SOCKET JOINT

Shoju Ishii, Hamamatsu, Japan, assignor to Rhythm Motor Parts Mfg., Co., Ltd., Shizuoka, Japan

Filed May 4, 1989, Ser. No. 347,041
Claims priority, application Japan, Jun. 6, 1988, 63-75568[U]
Int. Cl.[5] F16C *11/06*
U.S. Cl. 403—132 **1 Claim**



1. A ball-and socket joint comprising:

a housing having an open end at its upper end, the upper end having an inner peripheral surface which is chambered and inclines upward and radially inward;

a bearing element disposed in said housing;

a ball stud having a ball end retained in said bearing element and a shank portion extending from said ball end freely through said open end of said housing;

an end cover plate secured in a lower end of said housing; and

a resiliently yieldable member compressed between said bearing element and said end cover plate for urging said bearing element against said ball end of said ball stud;

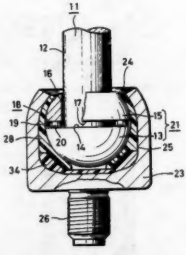
said inner peripheral surface of said open end of said housing being locally hardened by a high frequency hardening so as to have a predetermined hardness to prevent abrasion of said open end of said housing.

4,995,755

BALL JOINT

Youichi Hyodo, Okazaki; Tadao Muramatsu, Toyota, and Takaji Hattori, Hamamatsu, all of Japan, assignors to Toyota Jishoda Kabushiki Kaisha, Toyota, Japan

Filed May 23, 1989, Ser. No. 355,969
Claims priority, application Japan, May 24, 1988, 63-126684
Int. Cl.[5] F16C *11/00*; F16D *1/12*
U.S. Cl. 403—133 **10 Claims**



1. A ball joint for connecting the rack side of an automotive steering assembly with a tie rod side of said assembly, said ball joint comprising:

a ball stud said ball stud being connectable to one of said assembly rack side and tie rod side;

a first head member;

said first head member including a first facing surface and a first generally hemispherical surface;

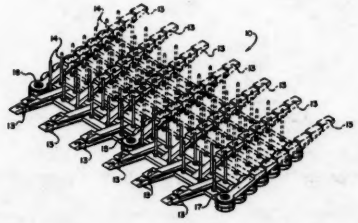
a second head member including a second facing surface and a second generally hemispherical surface;
said first and second facing surfaces facing each other and being spaced apart a predetermined distance apart;
a bearing member disposed in said predetermined distance;
said bearing member including means for permitting relative rotation between said first and second facing surfaces;
a ball seat enclosing said first and second head members;
a socket enclosing said ball seat;
a shank portion connected to said socket and extending generally coaxially with said ball stud, said shank portion being connectable to the other of said assembly rack side and tie rod side;
said first and second generally hemispherical surfaces together forming a generally spherical surface;
said socket including means for resiliently conformably enveloping said ball seat to a substantial portion of said generally spherical surface, whereby a substantial preload is applied to said first and second head members;
said ball stud being affixed to one of said first and second head members;
the other of said first and second head members including a shank hole for accommodating passage of said ball stud therethrough, thereby permitting relative rotation therebetween and;
an elastic member between said socket and said ball seat;
said elastic member being effective for applying a preload in a direction urging said first and second facing surfaces toward each other to compensate for wear in said ball joint.

4,995,756

VEHICLE TIRE DEFLATOR

Donald C. Kilgrow; Linda Kilgrow, both of P.O. Box 844, Monticello, Utah 84535, and Melvin H. Pedersen, 845 Park St., Salt Lake City, Utah 84102

Filed Jan. 29, 1990, Ser. No. 471,608
Int. Cl.[5] E01F *13/00*
U.S. Cl. 404—6 **7 Claims**



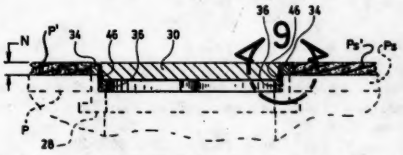
1. A vehicle tire deflator comprising, a plurality of rocker arms; means pivotally interconnecting said rocket arms to allow movement of said rocker arms to a side-by-side folded condition and an end-to-end extended condition; sockets formed in and spaced along each of said rocker arms; hollow spikes each having a base end for insertion into a said socket whereby a pointed end of each said hollow spike projects from said rocker arm; and actuator means connected to extend outwardly and upwardly from said rocker arms when said hollow spikes extend upwardly from the rocker arms, for first contacting a tire rolling thereon.

4,995,757

MANHOLE COVER ANNULAR SUPPORT FOR REPAVED STREET

Alain Prescott, 102 De Gaulle Street, Ville de Lorraine, Canada (J6Z 3Z2)

Filed Apr. 2, 1990, Ser. No. 502,685
Int. Cl.[5] E02D *29/14*
U.S. Cl. 404—26 **9 Claims**



1. In a street manhole defining an elongated manhole duct provided with a rigid collar member at its top mouth, said collar member having a radially inward annular cavity defining a base wall, parallel to the plane of said collar member and a side wall, orthogonal to the base wall, said collar member further defining a top wall parallel to said base wall; wherein a spacer member is provided for raising said cover from said collar base wall, said spacer member defining:

(a) a first rigid annular member, destined to sit on said collar base wall;

(b) a second rigid annular member, diametrally larger than said first annular member and destined to sit on said collar top wall; and

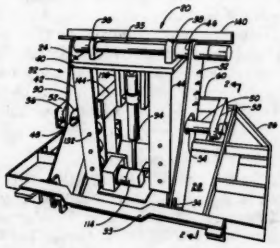
(c) connecting means, for coaxially interconnecting said annular members about spaced planes, said connecting means further including adjustment means to bring said first annular member to sit against said collar base wall and said second annular member to sit against said collar top wall, said adjustment means being responsive to a biasing load being applied transversely to the plane of at least one of said cover member and said second annular member.

4,995,758

CENTER BAR INSERTER

Don W. Smith, Edmond, Okla., assignor to CMI Corporations, Oklahoma City, Okla.

Filed Jul. 31, 1989, Ser. No. 387,946
Int. Cl.[5] E01C *23/04*
U.S. Cl. 404—88 **14 Claims**



1. An apparatus for inserting a bar into a concrete slab comprising:

a frame having an upper end, a lower end, a first side and a second side;
means for supporting the frame above the concrete slab;
a cage having an upper end and a lower end, wherein the cage is pivotally mounted about a horizontal axis thereof to the frame for rotation between a first position and a second position;
means for inserting the bar into the concrete slab, wherein

the means is slidably secured within the cage for selective movement between a retracted position and an extended position; and

means for supporting at least one bar above the concrete slab adjacent the means for insertion such that when the means for insertion is moved from the retracted position to the extended position in concert with the movement of the cage between the first position and the second position, the bar is driven to a selected depth within the concrete slab by the means for inserting.

4,995,759

DRAINAGE TUBE CONSTRUCTION

Jeffrey D. Plowman, Prinsburg, and Arnold H. Plowman, Willmar, both of Minn., assignors to Multi-Flow Tube, Inc., Prinsburg, Minn.

Filed Nov. 4, 1988, Ser. No. 267,969
Int. Cl.[5] E02B *11/00*
U.S. Cl. 405—43 **9 Claims**

1. A ground drainage system comprising a relatively narrow, elongated trench disposed along a roadway (or agricultural field); and a drainage tube construction disposed in the trench, said construction including a plurality of longitudinally extending, substantially tangential and generally parallel corrugated tubes oriented with respect to one another in a linear fashion so that in transverse cross-section the portions attaching the tubes to one another define a generally straight line perpendicular t the longitudinal dimension of the tubes, the tubes being generally vertically stacked with respect to one another, each tube except a top tube being attached at a 0° position to the next tube above it at the next tube's approximately 180° position, the corrugations being defined by alternating ribs and valleys, each tube having perforations in the valleys to allow fluid to enter therein and be drained away; the trench being backfilled with drainage soil to cover the drainage tube construction.

4,995,760

SCRAPING DEVICE FOR MAKING A SUBGRADE

Martin Probst, Riedstrasse 37, 7141 Steinheim; Herbert Schaffarzyk, Ellernstrasse 62, and Walter Schaffarzyk, Herman Allmersweg 13, both of 2870 Delmenhorst, all of Fed. Rep. of Germany

Continuation of Ser. No. 167,270, Mar. 11, 1988, Pat. No. 4,895,477. This application Dec. 20, 1989, Ser. No. 453,730
Claims priority, application Fed. Rep. of Germany, Mar. 13, 1987, 3708249
The portion of the term of this patent subsequent to Jan. 23, 2007, has been disclaimed.
Int. Cl.[5] E01C *19/22*
U.S. Cl. 404—119 **4 Claims**

1. Scraping device adapted to be towable over a subgrade to remove excess subgrade material from the surface thereof, said device comprising

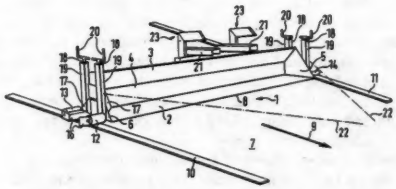
a rectangular lower wall (2) defining a scraping bar for removing excess subgrade material,

a rectangular top wall (3),

a rectangular rear wall (4) upstanding from said lower wall (2) and extending between said top and lower walls (2,3),

opposed side walls (5,6) respectively disposed at opposite ends of said lower, top and end walls (2,3 and 4) and being fastened together to define a bucket-shaped container for collecting removed excess subgrade material,

fastening means (17) attached to outside surfaces of said side walls (5,6),



holding devices (16) secured to each of said fastening means (17),

rollers (12,13) attached to said holding devices (16),

adjustment means (18,19,20) for adjusting said rollers (12,13),

said rollers (12,13) adapted to be rotatably disposed on a bar (10,11) whereby the bucket-shaped container may be moved longitudinally along the bars (10,11) and

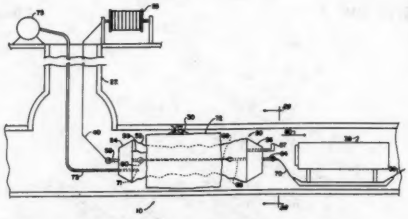
attachment means (21,23) disposed on the outside of the bucket-shaped container and being adapted for lifting and transporting the bucket-shaped container for emptying.

4,995,761

METHOD AND APPARATUS FOR REPAIRING RUPTURES IN UNDERGROUND CONDUITS

Kenneth S. Barton, 3921 Prospect Ave., Naples, Fla. 33942

Filed Aug. 23, 1989, Ser. No. 397,771
Int. Cl.[5] F16L *1/00, 55/18*
U.S. Cl. 405—154 **21 Claims**



1. Apparatus for repairing ruptures in underground conduits comprising:

an inflatable bladder that is introducible into a generally cylindrical conduit proximate a rupture therein, said bladder having a generally smooth surface in its inflated condition;

a flexible annular sleeve that is wrapped about and directly engageable by at least a portion of said bladder and is sufficient large to cover said rupture; and

means for inflating said bladder to urge said sleeve into generally conforming engagement with the entire inner circumferential surface of at least a section of said conduit such that said sleeve covers said rupture, said sleeve including an adhesive bonding substance that adheres said

sleeve to said conduit and is hardenable to bond said sleeve to said conduit.

4,995,762

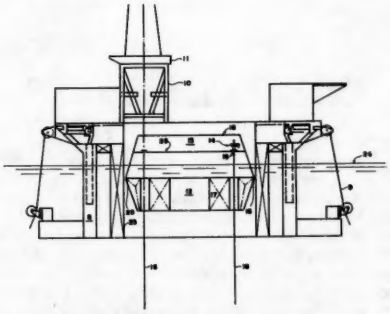
SEMISUBMERSIBLE VESSEL WITH CAPTURED CONSTANT TENSION BUOY

Jerome L. Goldman, 935 Gravier St., Suite 2100, New Orleans, La. 70112

Continuation of Ser. No. 221,422, Jul. 19, 1988. This application May 11, 1990, Ser. No. 522,319

Int. Cl.[5] E63B *35/44*

U.S. Cl. 405—195 **22 Claims**



1. A semi-submersible vessel, comprising:

a first and a second independently floating bodies, the first body being a constant tension buoy having a central well extending vertically through a hull of the buoy and allowing conducting of a well drilling operation, said buoy further comprising a plurality of radially located bays, each well bay being adapted to receive a rise line therein, the second body being a buoyant caisson having a central well extending through a hull of the caisson and wherein the first body is captured inside the central well of the second body and is held under a constant tension through a constant distance connection of the first body to a floor of a body of water independently from said second body and wherein said constant tension buoy is substantially unaffected by wave conditions affecting the buoyant caisson during operation, and wherein effects of wave conditions acting on both bodies are substantially reduced on the constant tension buoy.

4,995,763

OFFSHORE WELL SYSTEM AND METHOD

R. Mark Patteson, Houston, and Samuel C. Lynch, Montgomery, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jan. 26, 1990, Ser. No. 471,191

Int. Cl.[5] E02B *17/00*; F16L *21/00*

U.S. Cl. 405—195 **12 Claims**

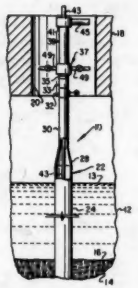
1. An offshore well system for conducting fluids between a point above the surface of a body of water and a point within a subterranean formation below said body of water comprising:

an elongated combination drivepipe and caisson extending from said formation to a point above the water surface:

means forming a landing surface near an upper end of said caisson,

at least a first casing string disposed within said caisson, said first casing string including means forming a casing hanger at an upper end thereof and cooperable with said means forming said landing surface for suspending said casing string in said caisson,

a wellbore fluid diverter secured to said caisson at a point above said landing surface and having an internal diameter large enough to permit insertion of said first casing string and said hanger through said diverter for landing said hanger on said landing surface; and



a wellhead body having an elongated pipe string connected thereto and insertable through said diverter for landing on a surface formed on said casing hanger.

4,995,764

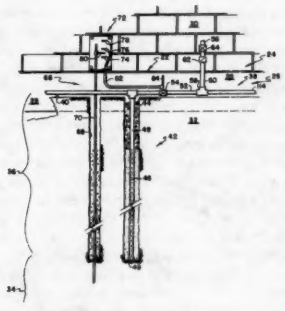
TECHNIQUE FOR STABILIZING BUILDING FOUNDATIONS

Daniel P. Connery, 337 Louise Dr., Corpus Christi, Tex. 78404; D. Dexter Bacon, 9649 Paula, Corpus Christi, Tex. 78410, and Stacy K. Blair, 3802 Caravelle #514, Corpus Christi, Tex. 78415

Filed Apr. 13, 1989, Ser. No. 339,596

Int. Cl.[5] E02B *11/00*; E02D *27/00*

U.S. Cl. 405—229 **15 Claims**



1. A foundation watering system comprising

a building in an area having a shrinking and swelling soil zone and having a foundation supported on the shrinking and swelling soil zone;

means for applying water to the shrinking and swelling soil zone; and

means for detecting movement of the foundation for controlling the water applying means for adding water to the shrinking and swelling soil zone.

4,995,765

METHOD OF COLLECTING WASTES AND SYSTEM THEREFOR

Tomoya Tokuhiro; Nobutaka Koibuchi; Teruhiko Miyauchi; Koshin Kikuchi; Jun Hirokawa, all of Tokyo; Kunio Yamashiro, Yokohama; Sakae Nishizuka, Yokohama; Ippei Watanabe, Yokohama; Shozo Maruo, Yokohama; Yohichiro Tsutsui, Yokohama, and Sadahito Ishikawa, Yokohama, all of Japan, assignors to Shimizu Construction Co., Ltd., Tokyo and Shinmeiwa Industry Co., Ltd., Nishinomiya, both of, Japan

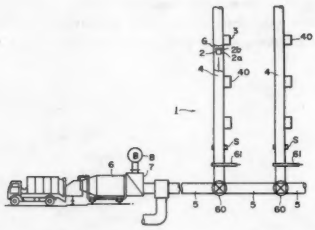
PCT No. PCT/JP87/01015, § 371 Date Apr. 18, 1988, § 102(e) Date Apr. 18, 1988, PCT Pub. No. WO88/04640, PCT Pub. Date Jun. 30, 1988

PCT Filed Dec. 22, 1987, Ser. No. 207,041

Claims priority, application Japan, Dec. 22, 1986, 61-305991; Jun. 23, 1987, 62-155809; Jul. 8, 1987, 62-170071; Jul. 8, 1987, 62-170075; Jul. 8, 1987, 62-170076; Jul. 8, 1987, 62-170077

Int. Cl.[5] B65G *51/36, 51/42, 51/20, 51/30*

U.S. Cl. 406—117 22 Claims



10. A waste collection system for transporting wastes from various positions in a building to a predetermined waste accumulation area, the waste being contained in a waste container of a predetermined configuration, said waste collection system comprising:

(a) a horizontal transport tube having an inner diameter slightly larger than an outer diameter of said waste container, being laid in an approximately same horizontal plane as said waste accumulation area, and having one end thereof openable at said waste accumulation area;

(b) a blower connected to said horizontal transport tube and which generates an air flow through said horizontal transport tube thereby transporting the waste container through the horizontal transport tube;

(c) a vertical transport tube whose inner diameter is slightly larger than the outer diameter of said waste container, said vertical transport tube being provided in an approximately vertical direction so as to communicate with floors of the building, and being connected to said horizontal transport tube at its lower end, so that said waste container descends therethrough to said horizontal transport tube, the vertical transport tube having means for slowing down the speed of descent of the waste container therethrough, the means for slowing down speed of descent including means for providing upward braking force to the waste container by virtue of pressurized air in the vertical transport tube beneath the waste container;

(d) an input port having an opening which opens towards the inside of the building at a first end thereof, said input port being connected to said vertical transport tube at a second end thereof, so that said waste container thrown in said opening is moved from said opening to said vertical transport tube;

(e) a shutter provided in said horizontal transport tube in the vicinity of the waste accumulation area, for opening/closing an end of the horizontal transport tube;

(f) classification means for identifying and classifying said waste container as it is stopped by said shutter and sending a classification signal; and

(g) moving means for receiving said waste container and selectively carrying the waste containers to plural positions according to said classification signals.

4,995,766

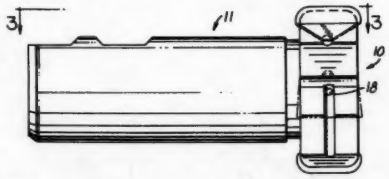
INSERT CUTTER

Robert L. Coleman, Oxford, Mich., assignor to GTE Valenite Corporation

Filed Aug. 14, 1989, Ser. No. 392,875

Int. Cl.[5] B23C *5/00, 5/02*

U.S. Cl. 407—34 12 Claims



1. Replaceable insert cutter comprising a cutting body, a plurality of insert pockets in the periphery of said body, each pocket having an insert back locating wall establishing insert circumferential position, a V-shape support seat establishing a radial and axial position of said insert, and a radial threaded screw hole extending inwardly from the axel of the V-shape support seat, a cutter insert mounted in said pocket having a back surface engaging said back locating wall, a V-shaped base of the insert seated on said support seat, a screw hole and screw extending radially toward the axis of the cutter body through said insert in retaining engagement with said threaded screw hole, and a radially outermost cutting edge facing circumferentially away from said back surface.

4,995,767

FACE MILLING CUTTER WITH INDEXABLE INSERTS

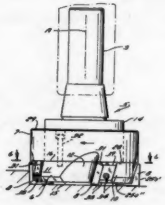
Arthur R. Segal, Jasper, Ind., assignor to North American Products, Corp., Jasper, Ind.

Continuation of Ser. No. 256,055, Oct. 11, 1988, abandoned.

This application Apr. 2, 1990, Ser. No. 502,833

Int. Cl.[5] B26D *1/12*

U.S. Cl. 407—41 3 Claims



1. A cutter body for a face milling cutter that has a predetermined effective diameter and is adapted for rotation about an axis in a predetermined direction; said cutter body being adapted to have a plurality of identical indexable cutting inserts of a predetermined inscribed circle size detachably secured to it at circumferentially spaced intervals around said axis, each said insert having flat relatively large leading and trailing surfaces that are opposite and parallel to one another and having four identical small, flat relief surfaces, each at an acute angle to said leading surface, which intersect said leading surface to define thereon four identical straight edges, each said edge extending at right angles to two of the others and being tangent to an imaginary inscribed circle of said size; said cutter body comprising a front member which is substantially

concentric to said axis and which has a front face at a front end thereof that defines a first plane normal to said axis, a rear face which is opposite said front face and is spaced axially rearwardly therefrom, a peripheral surface, and a plurality of identical recesses, one for each insert, that are spaced apart at circumferential intervals and each of which opens radially through said peripheral surface, axially forwardly through said front face and axially rearwardly through said rear face; said cutter body further comprising a rear member separable from said front member and from a spindle by which the cutter body can be carried for rotation, and releasable locking means cooperating with said front and rear members to detachably fix the rear member in concentric axially rearwardly adjacent relationship to the front member and in a predetermined rotational position relative to the front member;

said cutter body being characterized by:

A. said front member

(1) having every portion of its said peripheral surface at a radial distance from said axis that is substantially smaller than one-half of said effective diameter,

(2) having on its said rear face flat rearwardly facing surface areas which are all contained in a second plane normal to said axis that is spaced rearwardly from said first plane by a distance not substantially greater than the diameter of said inscribed circle;

B. each said recess defining on said front member a flat circumferential locating surface against which one of said relatively large surfaces on the insert for the recess is flatwise engageable to establish the circumferential position and rake angles of that insert, said circumferential locating surface

(1) facing substantially in one circumferential direction, and

(2) being oblique to, and having an intersection with, an imaginary plane that contains said axis and extends radially therefrom to that intersection, the inclination of the circumferential locating surface relative to that plane being radially outward and in said direction of rotation for positive radial rake, and axially forward and in said direction of rotation for positive axial rake;

C. each said recess further defining on said front member a flat, elongated radial locating surface which faces away from said axis and against which one of said relief surfaces on the insert is flatwise engageable to establish the radial position of the insert, said radial locating surface

(1) extending lengthwise substantially from said front face to said rear face,

(2) being lengthwise substantially parallel to said axis, and

(3) being spaced from said axis by a radial distance substantially equal to one-half of said effective diameter minus the diameter of said inscribed circle;

D. said rear member having a flat front face which is held engaged against said rearwardly facing surface areas on the front member by said releasable locking means;

E. said rear member further having thereon, at circumferentially spaced intervals therearound, a plurality of abutment elements, one for each said recess, each said abutment element

(1) projecting forwardly beyond said flat front face of the rear member,

(2) having thereon a flat, forwardly facing axial locating surface engageable by another of said relief surfaces on the insert for its recess to establish the axial position of the insert relative to the front member, and

(3) having its axial locating surface contained in a third plane normal to said axis which also contains the axial locating surfaces on the other abutment elements and which is spaced to the rear of said first plane by a distance smaller than the diameter of said inscribed circle;

F. said cutter body further comprising a plurality of insert clamps, one for each of said recesses,

(1) each comprising a screw having threaded engagement with said front member, and

(2) each arranged for forcefully but releasably engaging the other of said large surfaces on the insert for the recess to clampingly confine the insert against the circumferential locating surface defined by its recess, to thus releasably fix the insert relative to the cutter body; and

G. said releasable locking means comprising

(1) one of said body members being annular to have a coaxial central aperture,

(2) the other of said body members having a reduced diameter concentric neck portion projecting therefrom that is received with a close axially slidable fit in said central aperture in said one body member, and

(3) a plurality of further screws that extend parallel to said axis and are disposed at circumferentially spaced intervals around said central aperture and said neck portion, each having engagement with both of said body members.

4,995,768

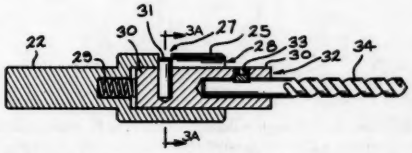
RAPID CHANGE DRILL HOLDER ASSEMBLY

Ralph Craft, 7221 Five Point Hwy., Easton Rapids, Mich. 48827

Filed Jul. 31, 1989, Ser. No. 387,005

Int. Cl.[5] B23B *51/12*

U.S. Cl. 408—239 A **4 Claims**



1. In a rapid change drill holder assembly, the combination comprising:

a chuck-engaging adaptor holder having a longitudinally extending chuck-engaging extension provided at one end thereof, said chuck-engaging adaptor holder having a tool holder adaptor receiving portion at the opposite end thereof, said tool holder adaptor receiving portion having an axially extending tool holder adaptor receiving bore longitudinally provided therein, said tool holder adaptor receiving bore provided with a tool holder adaptor engaging biasing spring at the inside terminal end thereof;

a transversely oriented tool holder adaptor peg receiving arcuate slot defined in the wall of said tool holder adaptor receiving portion, said arcuate slot being in open communication with said tool holder adaptor receiving bore, said arcuate slot having a tool holder adaptor peg engaging end wall provided at each end thereof;

a longitudinally extending tool holder adaptor peg receiving groove defined int he wall of said bore so as to extend from the open end of said bore into open communication with said arcuate slot, said peg receiving groove being in open communication with said arcuate slot at a point intermediate the distal ends of said arcuate slot;

a tool holder adaptor for selective operative engagement with said chuck-engaging adaptor holder, said tool holder adaptor having a tool receiving bore at one end thereof for selectively receiving a tool therein, said tool holder adaptor provided with a radially oriented tool-retaining setscrew for fixedly retaining a tool selectively positioned in said tool receiving bore, said tool holder adaptor having a cam follower peg radially extending outwardly from the side thereof, said cam follower peg adapted for selective movement through said tool holder adaptor peg receiving groove into operative alignment with said transversely oriented arcuate slot upon selective insertion of said tool holder adaptor into said tool holder adaptor receiving bore of said chuck-engaging adaptor holder, said tool holder adaptor selectively twisting so as to selectively move said cam follower peg into selective operative engagement with a selected distal end wall of said arcuate slot, said tool holder adaptor in selective biased engagement with said biasing spring so as to maintain said peg in its operative use engagement with said arcuate slot.

4,995,769

ROD CONVEYOR AND COMPARTMENT THEREFOR

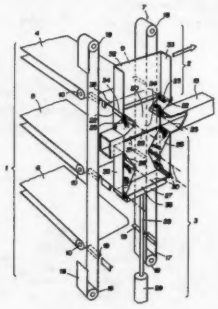
Maurice Berger, Cortaillod, and Michael Lauenstein, Cormondrèche, both of Switzerland, assignors to Fabriques de Tabac Reunies, S.A., Neuchatel, Switzerland

Filed Mar. 29, 1989, Ser. No. 330,306

Claims priority, application Switzerland, Apr. 5, 1988, 1248/88

Int. Cl.[5] B65B *19/04;* B65G *65/02, 65/40*

U.S. Cl. 414—403 7 Claims



1. A rod-conveying installation of the type having a conduit for receiving a flow of parallel rods oriented perpendicular to the direction of said conduit, an extractor for extracting rods from said conduit at a first location, a feeder for introducing rods into said conduit at a second location, a plurality of compartments for holding said rods, a compartment-filling means associated with said extractor, a compartment-emptying means associated with said feeder and a system for conveying and storing said compartments, wherein said compartments include an opening bottom, said conveying and storage system comprising two or more elongated and superposed levels for respectively receiving a number of parallel said compartments disposed in a row, and two vertical conveyor tracks interconnecting said levels at the ends thereof, said system being disposed in a vertical plane and arranged for moving said compartments solely in translation along a circuit capable of comprising different routes between said extractor and said feeder or vice versa, and said conduit being oriented in a direction intersecting said vertical plane at a point adjacent to said conveying and storage system.

4,995,770

BAG RUPTURING MECHANISM FOR WASTE MATERIAL DEBAGGING APPARATUS

Jack W. Crane, New Holland, Pa., assignor to Ford New Holland, Inc., New Holland, Pa.

Filed Dec. 26, 1989, Ser. No. 456,706

The portion of the term of this patent subsequent to Feb. 26, 2008, has been disclaimed.

Int. Cl.[5] B65G *65/34*

U.S. Cl. 414—412 2 Claims

1. A material debagging apparatus comprising:

a receptacle defining a chamber for holding bagged material;

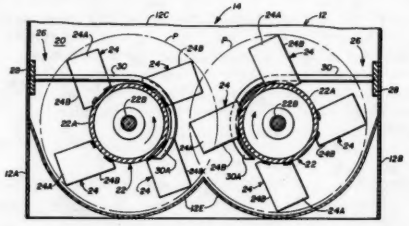
means for rupturing a bag disposed in said chamber and at least partially filled with material, said rupturing means being carried on said receptacle, said rupturing means including a pair of generally parallel rotatable members with a plurality of teeth mounted thereon;

drive means coupled to said rotatable members of said rupturing means for transmitting rotary power thereto and being operable to rotate said rotatable members for causing rupturing of the bag by said teeth;

means mounted on said receptacle for releasably clamping the bag in order to releasable secure the bag to said receptacle;

said teeth on each rotatable member being disposed in a plurality of circumferential rows spaced from one another axially along each rotatable member; and

said rupturing means also including a pair of grate-like structures each formed of a plurality of laterally spaced bars disposed above one of said rotatable members for supporting said bag and extending between said circumferential rows of teeth with outer ends of said teeth following circular paths of travel which project above said bars upon rotation of said rotatable members thereby bringing said outer ends of said teeth into engagement with the bag.



4,995,771

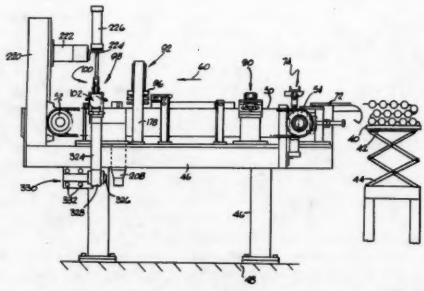
APPARATUS AND METHOD FOR DEBAGGING ARTICLES

William A. Sedgeley, and Ronald L. Moore, both of Golden, Colo., assignors to Adolph Coors Company, Golden, Colo.

Filed Jan. 26, 1990, Ser. No. 470,822

Int. Cl.[5] B65B *69/00*

U.S. Cl. 414—412 35 Claims



1. Apparatus for removing articles from a plurality of interconnected sealed compartments wherein each sealed compartment has a plurality of articles confined therein comprising:

a support structure mounted at a fixed location;

an endless conveyor mounted on said support structure and having an upper run and a lower run;

moving means for moving said endless conveyor;

said endless conveyor having a width extending perpendicular to the direction of movement of said endless conveyor;

dividing means extending in a widthwise direction on said endless conveyor for forming a plurality of holding units on said endless conveyor so that consecutive sealed compartments of said plurality of interconnected sealed compartments are located in consecutive holding units of said plurality of holding units;

each of said sealed compartments having a plurality of articles confined therein;

said plurality of interconnected sealed compartments being formed by two continuous webs of flexible material hav-

ing spaced apart widthwise extending sealing strips and spaced apart, continuous lengthwise extending end sealing strips;

cutting means mounted on said support structure for cutting said two continuous webs of flexible material at locations between each continuous end sealing strip and said articles in said compartments to form a cut compartment;

holding means mounted on said support structure for holding said cut compartment at a fixed location;

first force applying means mounted on said support structure for contacting an end article in said held cut compartment and applying a force thereto to move said plurality of articles out of said held cut compartment;

a receiving and transferring unit mounted on said support structure for receiving said articles pushed out of said held cut compartment;

conveying means for conveying said articles to further processing apparatus; and

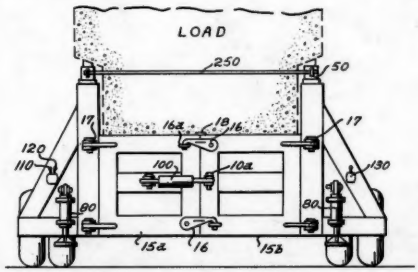
transfer means mounted on said receiving and transferring unit for transferring articles from said receiving and transferring unit to said conveying means.

4,995,772

SELF LOADING AND UNLOADING PRE-CAST CONCRETE HAULING UNIT

Richard R. Biggio, Rte. 1, Box 30, 756 River Rd., Lindley, N.Y. 14858

Filed Nov. 16, 1989, Ser. No. 437,264
Int. Cl.[5] B60P *3/00*
U.S. Cl. 414—458 **26 Claims**



1. A computer automated vehicle with hydraulic control for transporting concrete segments, comprising of:

a rigid U-shaped chassis;

a plurality of wheels mounted on said U-shape chassis to support said chassis above a roadway at a clearance height for rolling movement in a travel direction;

said U-shaped chassis being elongated and including an open end and in the travel direction a closed end, and two longitudinal lattice frames therebetween for defining a right and left side of said chassis, at least two movable beams attached to a top portion of said lattice frames to lift, support, and lower said precast concrete segments;

a hydraulic lifting system including a series of hydraulic cylinders imbedded vertically in both the right longitudinal lattice frame and left longitudinal lattice frame which cylinders when extended apply a lifting force to said movable beams;

a vertical locking system including a series of intersliding rectangular steel beams which extend and lock vertically to stabilize and secure said movable beam at a transport height;

a tailgate assembly mounted at said open end of said chassis, said assembly including at least two steel doors rotatably connected to said right and left lattice frames respectively, said doors open and close and lock through hydraulic control in order to secure both said right and left longitudinal lattice frames and said movable beams holding said concrete segments for transport, and means for fixedly locking said doors closed;

angular lattice bracing members connected to and protruding outwardly from both sides of said longitudinal lattice frames for reinforcing said chassis to counteract lateral movement of said wheels when rolling in said travel direction; and

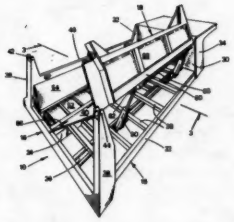
a computer system mounted near said closed end of said chassis to control and monitor lifting, supporting, and lowering of said precast concrete segments, said computer system including a microprocessor controlled analog/-digital input and digital/analog output to control said hydraulic lifting system, said vertical locking system, and said tailgate assembly in order to automatically load, secure for transport, and unload said concrete segments.

4,995,773

SPREADER AND DUMP TRUCK CONSTRUCTION

Guy Lamoureux, Drummondville, and Jean-Marie Bibeau, St. Gabriel de Brandon, both of Canada, assignors to Tenco Machinery Ltd., Quebec, Canada

Filed Jan. 3, 1990, Ser. No. 460,507
Int. Cl.[5] B60P *1/04*
U.S. Cl. 414—489 **5 Claims**



1. A spreader and dump box for a truck vehicle having a chassis with a rear portion, the dump box comprising a dump box frame pivotally mounted about a lateral axis on the rear portion of the vehicle chassis, the dump box frame further comprising a first sub-frame having longitudinal first and second side frame members and a front bulkhead having a side pillar on either side thereof mounted on the first and second side frame members, a pair of side pillars provided on the first and second side frame members at the rear of the first sub frame, the first sub-frame including at least a pair of longitudinal beam members extending parallel to the first and second side frame members and spaced an equal distance on either side of a central longitudinal axis of the dump box frame, the pair of beam members including a first channel-shaped beam member and a second channel-shaped beam member, the second channel-shaped beam member having an upper flange which is angled, a conveyor including a conveyor frame which has a pair of parallel edge members and a conveyor belt passing over the conveyor frame between the edge members, the conveyor frame being integrated in the first sub-frame between the first side frame member and the second channel-shaped beam member, an edge member of the conveyor frame being connected to the upper, angled flange of the second channel-shaped beam member, the other edge of the conveyor frame being connected to the first side frame member, a second sub-frame hingedly mounted on the first sub-frame member on one side of the conveyor between an edge member of the conveyor frame and the second side frame member, and having a hinge axis parallel and adjacent the conveyor frame edge member, the second sub-frame including a third side frame member coextensive with the second side frame member of the first sub-frame when the second sub-frame is in a lowered position, and a side wall being provided on the third side frame member of the second sub-frame adapted to fit between the side pillar of the bulkhead and the rear pillar on the second frame member of

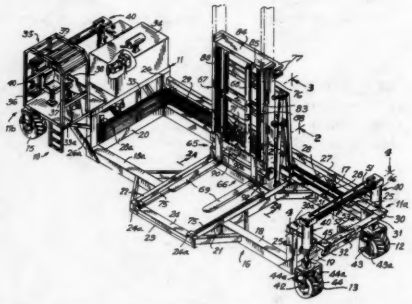
the first sub-frame and within a plane including the pillars, and means for pivoting the second sub-frame away from the first sub-frame about the hinge axis.

4,995,774

SIDE-LOADING FORK LIFT VEHICLE

Howard G. Nusbaum, Brooklyn, N.Y., assignor to Robert R. Gerzel, Orlando, Fla.

Filed Apr. 25, 1989, Ser. No. 342,999
Int. Cl.[5] B62D *1/00*; B66F *9/00*
U.S. Cl. 414—544 **9 Claims**



1. A side-loading fork lift vehicle for handling a heavy load which is long relative to its width, said vehicle comprising:

a. an elongated vehicle body having front and rear ends and opposite sides, front and rear ground wheels with independent axles, and respective vertical hydraulic piston and cylinder units interposed between said axles and said front and rear ends of said vehicle body for mounting the latter on said wheels;

b. respective motor means for driving said front and rear ground wheels in forward and reverse, and means for controlling the orientations of said front and rear ground wheels through respective 180° arcs composed of 90° arcs to either side of a line parallel to the longitudinal axis of said vehicle body for enabling movement of the vehicle in either straight ahead mode or lateral translation mode or radius turning mode or crabwise mode in either the forward or the reverse direction;

c. said vehicle body including (i) an elevated operator's cab at said rear end, of said vehicle body and (ii) an elongated, substantially rectangular load-carrying frame section arranged between said operator's cab and said front end of said vehicle body, said frame section including respective longitudinal beam means at said opposite sides of said vehicle body and a pair of spaced, parallel transverse beam means in the mid-region of said frame section and extending from one of said longitudinal beam means at one side of said vehicle body past the other of said longitudinal beam means at the other side of said vehicle body so as to have an end region located laterally outwardly of said vehicle body, said longitudinal and transverse beam means being disposed in a plane below that of said operator's cab and below that of said front end of said vehicle body, and said hydraulic piston and cylinder units being operable to maintain said beam means elevated above the ground when the vehicle is to be in motion and to lower said beam means to rest on the ground when the vehicle is to be stationary during an on-loading or off-loading operation;

d. guideway means on said transverse beam means and extending along the latter, a trolley mounted on said guideway means between said transverse beam means for reciprocal movement therealong, and first hydraulic piston and cylinder means mounted on said frame section for moving said trolley along said guideway means; and

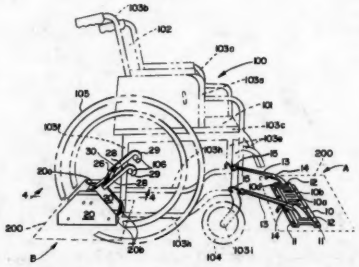
e. load-handling means arranged on said trolley and including a vertical framework carried by said trolley, mast means mounted in said framework for vertical up and down movement relative thereto, second hydraulic piston and cylinder means mounted on said trolley for moving said mast means up and down, and a plurality of fork arms carried by said mast means and extending therefrom in a direction away from said one side of said vehicle body, said fork arms being adapted, upon an appropriate movement of said trolley, to be retracted to a position within the confines of said frame section or protracted to a position outside the confines of said frame section beyond said other longitudinal beam means.

4,995,775

TIE DOWN APPARATUS FOR WHEELCHAIR

Gerald L. Gresham, 30800 Wixom Rd., Wixom, Mich. 48096

Filed Mar. 1, 1990, Ser. No. 486,818
The portion of the term of this patent subsequent to Dec. 12, 2006, has been disclaimed.
Int. Cl.[5] B60P *3/06*
U.S. Cl. 410—10 **19 Claims**



1. An apparatus for securing a wheelchair to the floor of a vehicle wherein the wheelchair has a front and a rear and includes a frame means with front posts mounting spaced apart front wheels on front axle means and rear axle means mounted on the frame means supporting spaced apart rear wheels behind the front wheels which comprises:

(a) a front attachment means for securing the front of the wheelchair to the floor; and

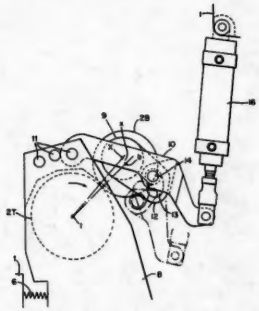
(b) a rear attachment means for securing the rear of the wheelchair to the floor including (i) a rear bar means which can mount on the rear of the frame means of the wheelchair; (ii) a fixed length foldable connection link means formed of rigid members and having opposed ends with a cross member means mounted horizontally at one of the ends and attached to the rear bar means at the other end and with a hinge means intermediate the ends of the link means which folds on a horizontal axis; and (iii) a floor support means with the cross member means secured between upright member means which are secured to the floor, wherein the cross member means with the floor support means, link means and rear bar means hold the wheelchair in position when the wheelchair is pulled in a forward direction and secured by the front attachment means.

4,995,776

OPERATING APPARATUS FOR FEEDING, TAKING UP AND TENSIONING A BINDING STRAP

Kanami Kato, Sakai, Japan, assignor to Signode Corporation, Glenview, Ill.

Filed Apr. 10, 1989, Ser. No. 335,934
Claims priority, application Japan, Apr. 15, 1988, 63-94338
Int. Cl.[5] B65B *13/02*
U.S. Cl. 410—100 10 Claims



1. Apparatus for feeding, taking up, and tensioning a binding strap, comprising:

a traction wheel;

a back-up wheel operatively associated with said traction wheel for defining a gap therebetween within which a portion of said binding strap can be disposed for movement in forward feeding and reversed retraction directions so as to achieve feeding and tensioning binding operations;

a pivotable support plate upon which one of said traction and back-up wheels is mounted;

means for eccentrically mounting the other one of said traction and back-up wheels such that said two wheels can relatively approach and separate from each other so as to retain said binding strap within said gap or permit introduction of said binding strap into said gap, respectively;

connecting link means for connecting said eccentrically mounted wheel to said support plate; and

spring means for biasing said support plate in a direction which will cause said eccentrically mounted wheel to be moved toward said one of said wheels in response to the biasing force of said spring means being transmitted to said eccentrically mounting means through said support plate and said connecting link means.

4,995,777

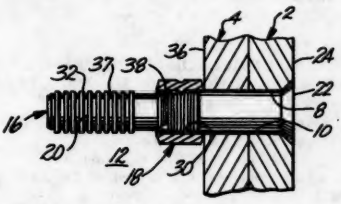
FASTENER WITH SELF-RETAINING COLLAR

John H. Warmington, Culver City, Calif., assignor to VSI Corporation, Culver City, Calif.

Filed Apr. 9, 1990, Ser. No. 506,665
Int. Cl.[5] F16B *19/00*
U.S. Cl. 411—361 17 Claims

1. A dimpled collar adapted for being swaged into locking grooves of a pin, the collar comprising:

a substantially right cylindrical member having a central bore, and an outer surface having a symmetrically located dimple which creates a detent of the collar material extending into the bore, the cylindrical member having an inner diameter slightly greater than an outer diameter of the locking grooves, except that the inner diameter of the cylindrical member at the detent is slightly smaller than the outer diameter of the locking grooves for frictionally engaging at least one of the locking grooves, the cylindrical member and detent being sufficiently resilient for sliding the collar over the locking grooves.

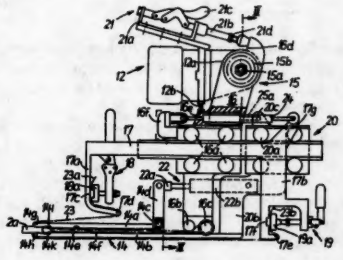


4,995,778

GRIPPING APPARATUS FOR TRANSPORTING A PANEL OF ADHESIVE MATERIAL

Richard Brüssel, Sulzfeld, Fed. Rep. of Germany, assignor to Krupp Maschinentechnik Gesellschaft mit beschränkter Haftung, Essen, Fed. Rep. of Germany

Filed Dec. 29, 1989, Ser. No. 460,282
Claims priority, application Fed. Rep. of Germany, Jan. 7, 1989, 3900342
Int. Cl.[5] B66C *19/00*
U.S. Cl. 414—20 11 Claims



1. A gripping apparatus for longitudinally transporting a panel of adhesive material in a first direction comprising:

a supporting frame having a direction-changing point which is stationary relative thereto;

a carriage supported by said frame for movement in said first direction;

release drive means for moving the carriage in said first direction;

holding tongs separated by said carriage and including upper and lower tong arms having mutually facing interior sides;

the upper tong arm pivotally mounted relative to the lower tong arm;

a tensioning frame mounted to said carriage for movement therewith in said first direction;

a continuous adhesion reducing sheet having opposed first and second end sections each secured to said tensioning frame, said sheet traversing a continuous path from said tensioning frame along the interior side of the upper tong arm, around the direction-changing point and thereafter in a second direction opposite to said first direction along the interior side of the lower tong arm, and thereafter around the lower tong arm in said first direction to said tensioning frame; and

a tong drive for pivotally moving said upper tong arm between a closed position, for gripping said panel with said tong arms as covered with said continuous adhesion re-

ducing sheet, and a release position in which further movement of said carriage in said first direction releases said panel from said tong arms and said continuous adhesion reducing sheet.

4,995,779

METHOD AND DEVICE FOR ALIGNING AND STORING IN A GIVEN ORDER MOLDINGS HAVING A TUBULAR PERFORATION

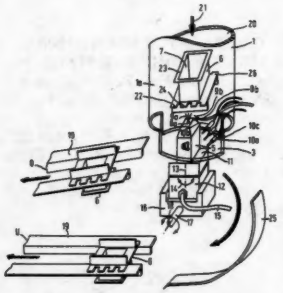
Torsten Müller, Hannover, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 25, 1989, Ser. No. 302,164

Claims priority, application Fed. Rep. of Germany, Feb. 9, 1988, 3803811

Int. Cl.[5] B65G *47/248*

U.S. Cl. 414—27 **14 Claims**



1. A method of aligning and storing in a given order moldings each having a tubular perforation, comprising the steps of:

providing a receiving mandrel profiled for reception in the tubular perforation,

providing an air turbulence space above the mandrel,

successively introducing the individual moldings into the turbulence space above the receiving mandrel,

subjecting each molding to an aligning air turbulence until the perforation is aligned with the mandrel, said turbulence being such that the molding then falls onto the receiving mandrel due to a decrease in air resistance resulting from the alignment,

passing each molding onto a deposition transport rail after reception on the mandrel.

4,995,780

HANDLING METHOD FOR DELIVERING BALED SOLID WASTE TO A BALEFILL

Daniel P. Dietzler, 150 N. Montclair, Glen Ellyn, Ill. 60137

Filed Sep. 15, 1989, Ser. No. 408,144

Int. Cl.[5] B65F *9/00*

U.S. Cl. 414—400 **11 Claims**

1. A method for handling solid waste in a compacted bale form comprising the steps of:

ejecting a compacted solid waste bale having a length and a width in the lengthwise direction from the bale door of a solid waste baler on to a platform means;

operating a ram means and pushing the bale widthwise and transversely along the platform means to the ejecting direction to one of at least two index positions;

ejecting a compacted second solid waste bale having a length and a width in the lengthwise direction from the bale door of the solid waste baler;

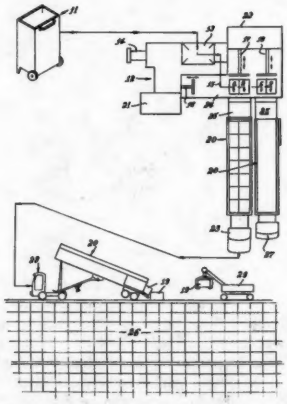
operating said ram means and pushing the second bale widthwise and transversely to the ejecting direction to the position of the first said bale;

displacing said first bale in said transverse direction for a distance substantially equal to the width of the second bale whereby said first and second bales form a pair of bales to be loaded;

operating a second ram means and pushing the pair of bales in the lengthwise direction and transversely to the first mentioned transverse direction into a covered plastic-lined trailer;

ejecting and pushing additional pairs of bales into the trailer until a desired load is reached;

closing door means of said trailer and maintaining said bales in a closed condition inside the trailer;



transporting said bales to a balefill site;

opening the door means of said trailer;

tilting the trailer to dump said bales in pairs at said balefill and advancing a rear edge of said trailer in a direction away from a first pair of dumped bales until all said pairs are dumped therefrom; and, picking the bales one at a time by mechanical means and stacking said bales at the balefill site.

4,995,781

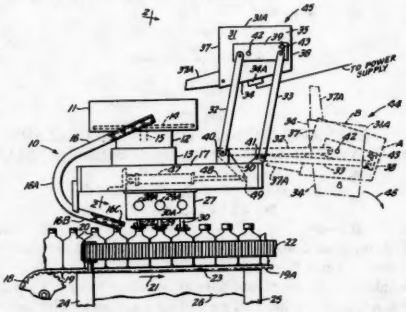
MOVABLE AUXILIARY HOPPER

Kenneth J. Herzog, 7 Westerly Ct., Hampton Bays, N.Y. 11946

Filed Nov. 3, 1989, Ser. No. 431,329

Int. Cl.[5] B65G *69/00*

U.S. Cl. 414—680 **6 Claims**



1. The combination of a movably mounted auxiliary hopper a cooperably associated dispensing hopper, and a platform therefor for discharging small articles contained in said auxiliary hopper to said dispensing hopper said dispensing hopper being mounted on said platform and adapted to feed said arti-

cles in an oriented position to a cooperably associated chute inclined downwardly to a receiving station,

said auxiliary hopper comprising a container having bottom, side and end walls and an open top for receiving a charge of small articles therein,

said container being adapted to provide gravity flow of said articles by demand to a discharge end of said container,

a U-shaped trough extending from the discharge end of the container and communicating with the interior of said container,

a pair of legs pivotally mounted to one side of said container and a complementary pair pivotally mounted on the other side thereof, and locking means disposed on each side of said container cooperably associated with said mounted legs for lockingly supporting said container in one or another of two home positions,

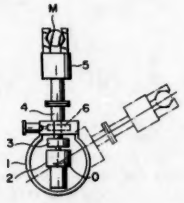
said legs extending to and being pivotally connected to said platform, such that the container is capable of being moved to an upper position for discharging articles to said dispensing hopper and to a lower accessible home position for charging articles to or to remove residual articles from said container.

4,995,782

APPARATUS FOR ROTATING A WRIST OF A ROBOT

Yasuyuki Suyama, Uji, Japan, assignor to Tsubakimoto Chain Co., Japan

Continuation-in-part of Ser. No. 752,942, Jul. 8, 1985, abandoned. This application Mar. 3, 1987, Ser. No. 21,103
Claims priority, application Japan, Jul. 16, 1984, 59-106385
Int. Cl.[5] B66C *1/00*
U.S. Cl. 414—732 **6 Claims**



1. Apparatus for rotating the wrist of a robot to selected indexing positions comprising:

a wrist shaft movable to a plurality of indexing positions;

a motor;

a friction coupling connecting the motor in driving relationship with the wrist shaft;

an indexing plate secured to the wrist shaft, the indexing plate having recesses in its periphery at positions corresponding to said indexing positions, the transitions between the outer periphery of the indexing plate and the recesses therein being convexly rounded and smoothly merging with said outer periphery;

a roller having a size such that it is able to engage each recess on both sides of the center thereof when the wrist shaft is in an indexing position;

spring means for pressing the roller against the periphery of the indexing plate;

proximity switch means;

means for actuating the proximity switch means each time the wrist reaches an indexing position;

means for disengaging the roller from the periphery of the indexing plate; and

control means repsonsive to the proximity switch means and to indexing signals corresponding to different selected indexing positions,

for initiating operation of the disengaging means and motor upon receiving any indexing signal other than one corresponding to the current indexing position of the wrist,

for releasing the disengaging means before the selected indexing position is reached, and

for cutting off power to the motor after release of the disengaging means but before the selected indexing position is reached;

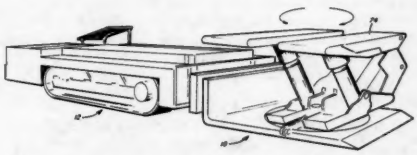
whereby the roller is urged against the periphery of the indexing plate before the wrist shaft reaches the selected indexing position so that the action of the roller against the convexly rounded trasition between the periphery of the indexing plate and the recess assists in moving the wrist into the selected indexing position.

4,995,783

MATERIAL HANDLING PLATFORM FOR MATERIAL TRANSPORT VEHICLE

Angelo S. Petitto; Angelo A. Petitto; James L. Petitto, and George W. Marshall, all of Morgantown, W. Va., assignors to Petitto Mine Equipment, Inc., Morgantown, W. Va.

Filed Jul. 26, 1989, Ser. No. 385,695
Int. Cl.[5] B65G *7/00*
U.S. Cl. 414—786 **2 Claims**



1. The method of placing an additional roof support in position adjacent a long wall type mining machine in an underground mine having a mine face comprising:

positioning a roof support to be transported on a substantially horizontal material handling platform of a material transport vehicle, said roof support positioned in a substantially horizontal position on said platform, said material handling platform having a turntable device that enables said roof support on said platform to be rotated horizontally on said platform relative to the longitudinal axis of said vehicle;

positioning said roof support on said platform so that the longest dimension of said roof support is aligned with the longitudinal axis of said vehicle;

moving said vehicle and said platform with said roof support thereon along said mine face behind said long wall mining machine to a location where said transported roof support is to be positioned;

rotating said turntable and said roof support on said material handling platform 90° about a vertical axis so that the longest dimension of said roof support is perpendicular to said vehicle longitudinal axis and to said mine face;

thereafter removing said transported roof support in said rotated position from said vehicle material handling platform onto the floor of said underground mine so that said longest dimension of said roof support is perpendicular to said mine face; and

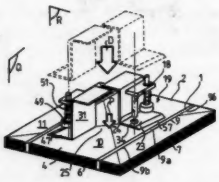
said transported roof support is removed from said material handling platform by tilting said platform from said substantially horizontal position to permit said roof support to slide off said platform.

4,995,784

PROCESS FOR BREAKING AND REMOVING A TIE SURROUNDING A BUNDLE

Jean L. Boisseau, Bucheres, France, assignor to Vega Automation, Saint Luc, France

Filed Jun. 28, 1989, Ser. No. 372,897
Claims priority, application France, Jun. 29, 1988, 8808745
Int. Cl.[5] B65B *69/00*
U.S. Cl. 414—786 10 Claims



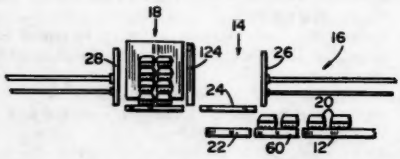
1. A process for breaking and removing a tie surrounding a bundle and arranged in a vertical plane by means of a device comprising means for holding the bundle, means for the transverse breaking of the tie having a plate, means for holding the tie and means for removing the broken tie from the bundle, the process comprising the steps of: holding the bundle with the tie to be broken and removed, creating a transverse spacing between the tie and an upper surface of the bundle by exerting two oppositely directed forces on the bundle to deform the upper surface of the bundle adjacent the tie, then positioning the breaking means into the vicinity of the tie of said bundle with the plate being between the upper surface and tie, and then simultaneously activating the breaking means in order to break the tie transversely, the means for holding and removing the broken tie and ceasing to hold the bundle so that the tie is broken and held as the bundle falls away from the held tie.

4,995,785

EGG CARTON STACKING-LOADING DEVICE AND METHOD

Kornelis Platteschorre, 4273 Mohave Ct., Grandville, Mich. 49418

Division of Ser. No. 907,225, Sep. 12, 1986, Pat. No. 4,787,799.
This application Aug. 10, 1988, Ser. No. 230,749
Int. Cl.[5] B65G *57/00*
U.S. Cl. 414—790.3 33 Claims



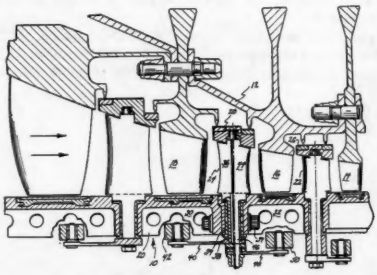
1. A loading device for stacked packages, comprising:
a frame;
a transfer region and a laterally aligned storage region;
a stacking region laterally aligned with said transfer region;
at least two transfer panels mounted on said frame to be selectively positionable on generally opposite sides of said stacking region, said transfer panels being movably mounted on said frame so as to selectively shift to generally opposite sides of said transfer region, whereby said transfer panels shift a stack of packages from said stacking region to said transfer region;
a support panel and a pusher panel generally normal thereto laterally movably mounted on said frame, said support panel and said pusher panel having a retracted position disposed at said transfer region and an advanced position disposed at said storage region, said support panel having an unloading position in which said support panel slopes downwardly from said pusher panel and a loaded position pivoted from said unloading position to at least a horizontal position;
means for simultaneously advancing said support panel and said pusher panel, and for independently retracting said support panel and said pusher panel; and
means for pivoting said support panel between said loaded and unloading positions, whereby a stack of packages supported on said support panel are moved to said storage region by the simultaneous advance of said pusher panel and said support panel, said support panel is pivoted to said unloading position and independently withdrawn so that said pusher panel forces the stack of packages off said support panel.

4,995,786

DUAL VARIABLE CAMBER COMPRESSOR STATOR VANE

Jerry W. Wheeler, Holland, Pa., and Walter H. Wiley, III, Palm Beach Gardens, Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Sep. 28, 1989, Ser. No. 413,574
Int. Cl.[5] F01D *17/08, 17/12*
U.S. Cl. 415—148 6 Claims



1. A compressor stator vane for a gas turbine engine, said vane having a leading edge section and a trailing edge section, each section having a shaftlike portion extending through the outer casing of said engine, a shaftlike projection supporting an inner shroud of said engine, and an airfoil portion between said shaftlike portion and said shaftlike projection, means connected to the shaftlike portion of each edge section for adjusting the position of each edge section, and control means connected to said section adjusting means to actuate said section adjusting means and vary the camber of said vane.

4,995,787

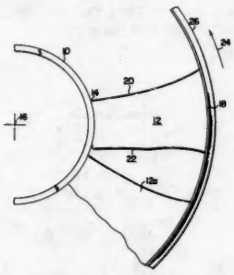
AXIAL FLOW IMPELLER

John F. O'Connor, Torrington, Conn., assignor to Torrington Research Company, Torrington, Conn.

Filed Sep. 18, 1989, Ser. No. 408,744
Int. Cl.[5] B63H *7/00;* F01D *5/00*
U.S. Cl. 416—228 7 Claims

1. An axial flow air impeller for automotive radiator, heat exchanger use and the like comprising a hub adapted for rotation about an axis and carrying a plurality of integrally formed similar circumaxially spaced and generally radially outwardly projecting air moving blades, each of said blades having a root end portion integral with the hub and a radially outwardly disposed tip end portion with smoothly curving side edges therebetween, said air impeller being adapted for undirectional rotation and said side edges comprising leading and trailing viewed from root end portion to tip end portion, the projected width of each blade thus being at least 40% greater at the tip end portion than at the root end portion, the maximum thick-

ness of each blade varying from a maximum at the root end portion to a minimum at the tip end portion, and the maximum thickness at the tip end portion being at least three times the thickness at the blade trailing edge, and an orifice ring integral



with each blade tip end portion and circumscribing the plurality of blades, said ring having upstream and downstream ends and having a flange at one end with a substantially smooth radius at the junction with the ring portion.

4,995,788

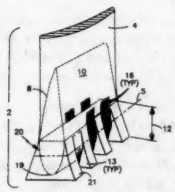
COMPOSITE ROTOR BLADE

Jay E. Turnberg, Longmeadow, Mass., assignor to United Technologies Corporation, Hartford, Conn.

Filed Sep. 8, 1989, Ser. No. 404,545

Int. Cl.[5] F01D *5/14*

U.S. Cl. 416—230 **13 Claims**



1. A composite blade including a spar and a composite material, the spar having a root section and a radially outward extending surface, the composite material being layered on the radially outward extending surface and forming an airfoil surface, the root section installable in a recess in a rotor hub, the root section mateable with a complementary shaped hub recess,

wherein the root section is located radially inward of a blade base plane, said plane being tangent to the outer diameter of the rotor hub and passing through the hub recess,

and wherein the spar includes a spar recess originating and extending from the root section toward the radially outward extending surface, and

wherein the composite material is wrapped in a spanwise fashion in relation to the airfoil along the radially outward extending surface of the spar and about the spar root and captured within the spar recess.

4,995,789

ENCLOSED TYPE ELECTRIC COMPRESSOR

Katuharu Fujio, Shiga, Japan, assignor to Matsushita Electric Industrial Co. Ltd., Osaka, Japan

Filed Jun. 26, 1989, Ser. No. 371,471

Claims priority, application Japan, Jun. 28, 1988, 63-159997

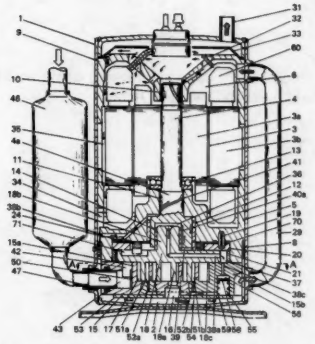
Int. Cl.[5] F04C *15/00*

U.S. Cl. 417—360 **10 Claims**

1. An enclosed type electric compressor comprising:

an electric motor including a rotor having a longitudinal axis and a stator having a longitudinal axis, said rotor being mounted for rotation with respect to said stator, said stator further including an outer periphery, a first end and a second end;

a compressor including a drive spindle having a longitudinal axis, a first end and a second end, said drive spindle being fixedly secured to said rotor for rotation therewith, said compressor further including a fixing member having a longitudinal axis and an outer periphery, said fixing member rotatably supporting said first end of said drive spindle and being pressed onto and fixed to said outer periphery of said stator at said first end thereof;



a bearing frame having a longitudinal axis and an outer periphery, said bearing frame rotatably supporting said second end of said drive spindle and being pressed onto and fixed to said outer periphery of said stator at said second end thereof; and

an enclosing vessel for receiving said electric motor, said compressor and said bearing frame therein and including an inner wall, said outer periphery of said fixing member and said outer periphery of said bearing member being pressed onto and fixed to said inner wall of said enclosing member, said rotor, stator, drive spindle, fixing member and bearing frame being concentrically mounted within said enclosed vessel such that said longitudinal axes thereof are aligned.

4,995,790

VERTICAL BARREL PUMP

Jürgen Schill, Weisenheim; Hans F. Heene, Gerolsheim; Rainer Stahl, Frankenthal, and Friedrich Weber, Bobenheim-Roxheim, all of Fed. Rep. of Germany, assignors to Klein, Schanzlin & Becker Aktiengesellschaft, Frankenthal, Fed. Rep. of Germany

Filed Apr. 24, 1986, Ser. No. 855,884

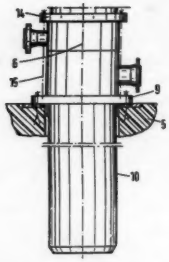
Claims priority, application Fed. Rep. of Germany, Apr. 30, 1985, 3515547

Int. Cl.[5] F04B *39/14*

U.S. Cl. 417—360 **1 Claim**

1. A vertical centrifugal pump comprising an annular support; a pump barrel extending through said support and having a peripheral wall defining a shoulder which rests on said support; and means for separably securing said barrel to said support; wherein said peripheral wall includes a first portion

having a first wall thickness, and a second portion having a second wall thickness smaller than said first wall thickness, said



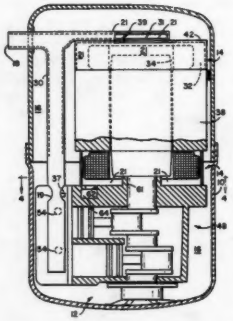
first and second portions cooperating to define said shoulder; wherein said barrel is devoid of flanges.

4,995,791

REFRIGERANT GAS COMPRESSOR UNIT

Joseph F. Loprete, Bristol, Tenn., assignor to Bristol Compressors, Inc., Bristol, Va.

Filed Nov. 25, 1988, Ser. No. 276,020
Int. Cl.[5] F04B *39/06*
U.S. Cl. 417—366 **8 Claims**



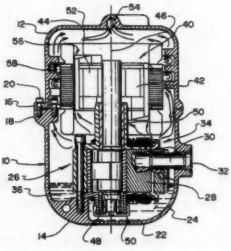
1. A gas compressor unit comprising a casing, an electric motor driven compressor mounted in said casing, a housing containing the inner cavities or passages of the motor, refrigerant suction port means in said casing, primary-feed conduit means connecting said suction means to the intake of said compressor, secondary-feed conduit means including said housing and connecting said suction port means to said primary-feed conduit means, refrigerant flow control means associated with said secondary-feed conduit means for regulating refrigerant flow therethrough, said flow control means provides a pressure drop from said secondary-feed conduit means to said primary-feed conduit means, and refrigerant discharge port means in said casing communicating with the compression chamber of said compressor.

4,995,792

COMPRESSOR SYSTEM WITH SELF CONTAINED LUBRICANT SUMP HEATER

Paul D. Brown; William J. Godecker, and Charles B. Parme, all of San Diego, Calif., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Aug. 28, 1989, Ser. No. 399,261
Int. Cl.[5] F04B *39/02*
U.S. Cl. 417—366 **9 Claims**



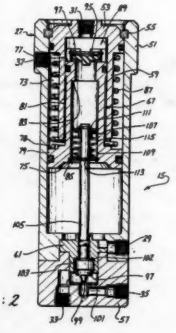
1. A compressor comprising:
a housing;
a compressing mechanism within said housing;
an outlet for compressed gas from said compressing mechanism;
an inlet for gas to be compressed to said compressing mechanism;
a sump within said housing for containing a lubricant for said compressing mechanism and in fluid communication with at least one of said compressing mechanism, said inlet and said outlet; and
means for heating the contents of said sump by exchanging heat from said compressed gas to said lubricant to decrease the solubility of the gas within the lubricant.

4,995,793

REVERSE OSMOSIS SYSTEM AND AUTOMATIC CYCLING BOOSTER PUMP THEREFOR

Donald F. Solomon, Hemet, Calif., assignor to Product Research and Development, Santa Ana, Calif.

Division of Ser. No. 111,697, Oct. 21, 1987, Pat. No. 4,836,924.
This application Apr. 18, 1989, Ser. No. 340,545
Int. Cl.[5] F04B *21/00*
U.S. Cl. 417—403 **7 Claims**



1. A fluid driven pump comprising:
a housing having a cavity, an inlet port and an outlet port;
a differential area piston reciprocable in said housing through pumping and return strokes and dividing the

cavity of the housing into an inlet chamber communicating with the inlet port and an outlet chamber communicating with the outlet port, said piston having a first relatively larger area face in said inlet chamber and a second smaller area face in the outlet chamber whereby fluid in the inlet chamber can drive the piston on a pumping stroke and deliver fluid at increased pressure at the outlet port;

means for reversing the piston including a reversing valve openable to initiate the return stroke and closable to initiate the pumping stroke;

means including a portion of the reversing valve for defining a valve chamber on one side of said portion of the reversing valve whereby a pressurized fluid in the valve chamber tends to close the reversing valve;

means defining a bleed passage leading from said valve chamber; and

resilient means energized by the piston for closing the reversing valve after termination of the return stroke and before initiation of the next pumping stroke.

4,995,794

VACUUM PUMPS

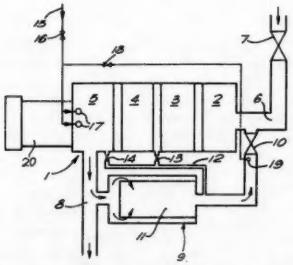
Henryk Wycliffe, Crawley, United Kingdom, assignor to The BOC Group, plc, Windlesham, England

Filed Apr. 21, 1989, Ser. No. 341,528

Claims priority, application United Kingdom, Apr. 22, 1988, 8809621

Int. Cl.[5] F04B *25/00, 39/00*

U.S. Cl. 417—431 **7 Claims**



1. A vacuum pump comprising a pumping chamber having an inlet and an outlet and through which gas from an enclosure connectible to the inlet can be pumped, a conduit, arranged in parallel with the pumping chamber, linking the inlet and the outlet of the pumping chamber, and having a filter, and means for allowing the selective introduction of a flow of recirculating purge gas to a gas circuit including the inlet and the outlet of the pumping chamber, the conduit, the filter and the pumping chamber to effect purging of the pumping chamber.

4,995,795

NOISE REDUCING WEAR SHIELD FOR PISTON FACE

Thomas Hetzel, Sheboygan, and Roy J. Rozek, Plymouth, both of Wis., assignors to Thomas Industries Incorporated, Louisville, Ky.

Filed Sep. 28, 1989, Ser. No. 413,596

Int. Cl.[5] F04B *21/02*

U.S. Cl. 417—571 **18 Claims**

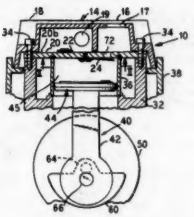
1. A gas compressor comprising:

a cylinder;

a piston residing interior of said cylinder and movable along an axis of said cylinder, with a surface facing interior of said cylinder;

a head connected to an end of said cylinder and facing interior of said cylinder;

a valve attached to one of said head and said piston and opening interior of said cylinder;



a wear shield secured to a respective other one of said piston and said head, opposite said valve, preventing repetitive contact from said valve onto said respective other one of said piston and said head during operation.

4,995,796

MULTI-SECTION ROOTS VACUUM PUMP OF REVERSE FLOW COOLING TYPE

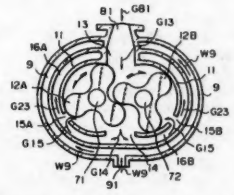
Shigeharu Kambe, Kawasaki, and Tutomu Higuchi, Yokohama, both of Japan, assignors to Unozawa - Gumi Iron Works, Ltd., Tokyo, Japan

Filed Aug. 31, 1989, Ser. No. 400,993

Claims priority, application Japan, Sep. 5, 1988, 63-220496

Int. Cl.[5] F04C *23/00, 25/02, 29/04*

U.S. Cl. 418—9 **1 Claim**



1. A multi-section Roots vacuum pump of the reverse flow cooling type having a plurality of pump sections each having rotors fixed to two common shafts, said pump comprising:

a housing in each of said pump sections, said housing comprising an inner circumferential wall, an intermediate circumferential wall, an outer circumferential wall, an inlet and an outlet for a gas to be pumped through said housing, and an inner chamber enclosing rotors, said inner chamber being formed by said housing inner circumferential wall;

peripheral gas passages formed between said inner circumferential wall and said intermediate circumferential wall, said inner circumferential wall comprising a plurality of reverse flow cooling inlets extending between said peripheral gas passages and said inner chamber;

peripheral coolant water passages arranged around said peripheral gas passages and formed between said intermediate circumferential wall and said outer circumferential wall;

wherein the gas flowing through said inlet into said housing and delivered through said outlet is supplied to said peripheral gas passages for cooling, and at least a portion of the cooled gas is returned into said inner chamber through said inner circumferential wall reverse flow cooling inlets, and

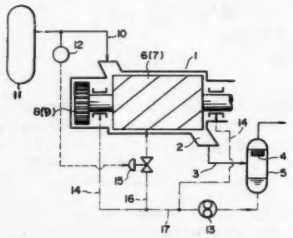
the remaining portions of the gas which are not returned into the housing in the pump sections except for the last pump section are supplied to the inlet of the next pump section through said peripheral gas passage.

4,995,797

ROTARY SCREW VACUUM PUMP WITH PRESSURE CONTROLLED VALVE FOR LUBRICATION/SEALING FLUID

Noboru Tsuboi, Kakogawa, Japan, assignor to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Nov. 20, 1989, Ser. No. 438,012
Claims priority, application Japan, Apr. 13, 1989, 1-95686
Int. Cl.[5] F04C *18/16, 25/02, 27/02*
U.S. Cl. 418—84 2 Claims



1. A screw vacuum pump comprising:
a pump body having a pair of male and female screw rotors meshing with each other with a small gap defined therebetween, one of said screw rotors being driven,
a pair of rotor shafts mounting said screw rotors,
a pair of synchronizer gears mounted on said rotor shafts and meshing with each other to synchronously rotate both said screw rotors.
a rotor chamber accommodating said screw rotors,
a plurality of lubricating portions including bearing portions for lubricating said rotor shafts
an oil stripper for separating a compressed gas from an oil,
a discharge gas line leading from discharge port of said pump to said oil stripper,
an oil circulation line leading from said oil stripper to said lubricating portions and said rotor chamber in said pump body, said oil circulation line being branched to a first line leading to said lubricating portions and a second line leading to said rotor chamber,
a closing valve provided in said second line, and
a pressure switch comprising means for detecting a suction pressure of said pump body, wherein said closing valve is responsive to the pressure detected by said pressure switch for opening said closing valve when the suction pressure detected by said pressure switch falls below a predetermined value and reaches a high level of vacuum.

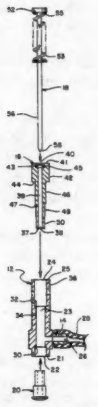
4,995,798

APPARATUS FOR WINDSHIELD REPAIR

Stephen L. Ameter, 1715 Linda La., Olney, Ill. 62450

Filed Jun. 30, 1989, Ser. No. 374,946
Int. Cl.[5] B32B *35/00*
U.S. Cl. 425—012 11 Claims

1. An apparatus for repairing laminated glass consisting essentially of
(1) a resin injector member having a tubular tip portion and three telescoping portions having means of engagement for stationary positioning thereof, including, a tubular body portion having openings at each opposed end thereof, a tubular vacuum stem extending outwardly from said body portion, a tubular tip portion positioned in one of the said openings having an opening therein adapted to provide access to said vacuum stem, a tubular mid-portion having an opening at each opposed end thereof and disposed to fit snugly within said body portion, and a cylindrical plunger portion, one end having a slightly enlarged portion adapted for gripping said plunger portion and an opposed end disposed to fit snugly within said mid-portion; and
(2) a support member having a planar base member, at least one leg member for supporting said base member, a suction cup, means of attachment for fixing said suction cup to said base, and an aperture through said base member



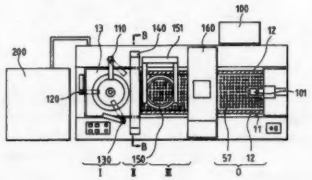
having means for engaging said injector member, wherein said support member and said injector member are removeably engaged and attached by means of said suction cup to a laminated glass surface for repair thereof.

4,995,799

OPTICAL DISC MANUFACTURING APPARATUS

Ryutaro Hayashi, and Noriaki Kaneko, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Oct. 17, 1988, Ser. No. 258,351
Claims priority, application Japan, Oct. 15, 1987, 62-259904
Int. Cl.[5] B29D *17/00;* B29C *33/06*
U.S. Cl. 425—111 10 Claims



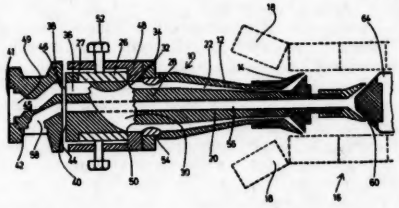
1. An apparatus for manufacturing a substrate having a transfer layer corresponding to an optical pattern by providing a liquid radiation-setting resin between a stamper carrying said optical pattern and said substrate and by setting said radiation-setting resin, comprising:
a frame;
a support member movable on said frame;
a turntable rotatably supported on said support member and including a flat portion carrying said stamper and having a recess at the center of said turntable;
a center boss arranged in said recess and supported on said support member such that said center boss is rotatable on a same axis of rotation as said turntable and is movable with said turntable along said axis of rotation;
push means for pushing the outer circumference of said substrate, after said substrate is placed on said center boss, onto said flat portion of said turntable; and
gas pressure control means communicating with said recess of said turntable for adjusting pressure in said recess.

4,995,800

EXTRUSION DIE ASSEMBLY

Manfred A. A. Lupke, 92 Elgin St., Thornhill, Ontario, Canada (L3T 1W6)

Filed Oct. 2, 1989, Ser. No. 415,586
Claims priority, application Canada, Oct. 11, 1988, 579800
Int. Cl.[5] B29C *47/06*
U.S. Cl. 425—131.1 5 Claims



1. An extrusion die assembly for fine adjustment of double walled tubing comprising an extrusion die head including an inner member having first and second parallel side-by-side inlet passages for extrudate leading thereinto, the inlet passages converting into inner end and outer coaxial outlet passages for extrudate leading there out of;

a mandrel projecting from the inner member, an extension passage of the inner passage extending through the mandrel to open at a free end thereof;

an outer member disposed about the inner member having centering means to adjust the position of the inner member and hence the mandrel; and

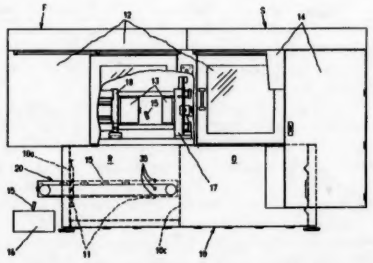
a generally cylindrical, hollow, extension nozzle positioned about the mandrel, an annular nozzle extrusion passage being defined between the mandrel and the nozzle, one end of the extrusion nozzle being open for delivery of extrudate and the other end communicating the nozzle passage with the outer outlet passage.

4,995,801

INJECTION MOLDING MACHINE PROVIDED WITH A CONVEYOR FOR DELIVERING MOLDING FROM THE MACHINE

Karl Hehl, Arthur-Hehl-Str. 32, D-7298 Lossburg, Fed. Rep. of Germany

Filed Jul. 19, 1989, Ser. No. 382,730
Claims priority, application Fed. Rep. of Germany, Aug. 18, 1988, 3827987
Int. Cl.[5] B29C *45/84*
U.S. Cl. 425—151 17 Claims



1. In an injection molding machine comprising:

a machine pedestal;

an injection mold mounted on said machine pedestal and adapted to be opened to permit at least one molding to fall out of said mold into said pedestal, said mold having a vertical projection; and

a conveyor comprising a reversing pulley device, a motor for driving said reversing pulley device and a conveying belt, said belt having a vertical longitudinal plane of symmetry and being trained around said reversing pulley device, and said belt having an outwardly facing conveying surface, said conveying surface extending in said pedestal below said mold and arranged to receive moldings which have fallen out of said mold,

the improvement residing in that

said conveying belt comprising a series of slats, which constitute said conveying surface, said slats produced from a material selected from the group consisting of metal and heat-resisting plastics,

said reversing pulley device comprising a chain sprocket apparatus,

said conveyor also comprising first and second link chains, which are trained around and in mesh with said chain sprocket apparatus and extend along said conveying surface on opposite sides thereof and along lines which are approximately symmetrical to said plane of symmetry,

each of said link chains comprising a series of chain links,

each of said slats has a first end and an opposite second end, said first end of each slat being connected to one of said chain links of said first link chain and said second end of each slat being connected to one of said chain links of said second link chain to form a slat-link assembly,

wherein said slat of each of said slat-link assemblies is detachably connected to the chain links, and

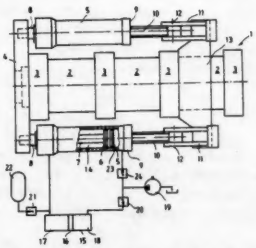
wherein each of said slat-link assemblies further comprises two plastic connectors detachably connected to said first and second ends of said slat forming said slat-link assembly and detachably connected to said two chain links forming said slat-link assembly.

4,995,802

APPARATUS FOR EXTRUDING PLASTIC MATERIALS

Dietmar Müller, Karlsruhe; Helmut Bauer, Malgersdorf; Harald Franken, Karlsruhe, and Harry Seiter, Pfinztal, all of Fed. Rep. of Germany, assignors to Fraunhofer-Gesellschaft zur Forderung der angewandten Forschung e.V., Munich, Fed. Rep. of Germany

Filed Jul. 28, 1989, Ser. No. 386,102
Claims priority, application Fed. Rep. of Germany, Aug. 5, 1988, 3826641
Int. Cl.[5] C06B *21/00*; B29C *47/96*
U.S. Cl. 425—154 10 Claims



1. Apparatus for extruding plastic explosives or propellants, the apparatus comprising a casing, at least one pressing member movably mounted in said casing, a shaping retainer plate terminating an outlet side of the casing, means for fixing the retainer plate to the casing so as to be automatically raised relative to the casing upon an occurrence of a pressure within the apparatus exceeding a preset pressure, said means for fixing including a pneumatic spring means having a spring force substantially corresponding to said preset pressure, control

means for applying a first control hydraulic pressure corresponding to the preset pressure on the pneumatic spring means, and hydraulic adjusting means for applying a second control pressure exceeding the preset pressure to the pneumatic spring means in a direction in opposition thereto to enable an arbitrary exceeding of the preset pressure to permit a selective raising of the retainer plate relative to the casing.

4,995,803

APPARATUS FOR CONTINUOUSLY PRODUCING SUBSTANTIALLY PARALLELEPIPEDAL PIECES OF MEAT

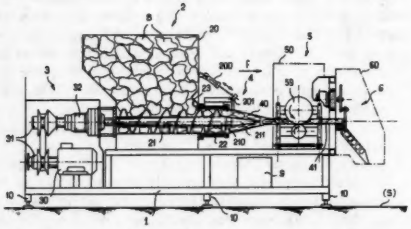
Jean-Claude Champalaune, Merdrignac; Yvon Corveler, Pontivy, and André Coutard, Villers Bocage, all of France, assignors to Kaufler S. A., Loudeac, France

Filed Sep. 12, 1989, Ser. No. 406,014

Claims priority, application France, Sep. 13, 1988, 88 12070

Int. Cl.[5] B29C *47/08;* A23L *1/317;* A23P *1/12*

U.S. Cl. 425—190 **5 Claims**



1. An apparatus for continuously producing substantially parallelepipedal pieces of meat from blocks of meat having larger dimensions than said pieces of meat, said apparatus comprising an Archimedean screw unit for supplying said blocks of meat and, at an outlet of said screw unit, a shaping device comprising a first part in the form of a funnel having an entrance of substantially circular cross-section and an exit of rectangular cross-section and a second part consisting of an extrusion device of parallelepipedal form, said extrusion device having a cross-section substantially identical to that of said exit of said first part, said apparatus also comprising a plurality of longitudinal cutting members in said second part of said shaping device, each of said longitudinal cutting members being movably disposed through a respective pair of longitudinal slots in opposite faces of said second part, means for moving said longitudinal cutting members in order to cut an extruding meat block into a plurality of meat streams, transverse cutting members and means for moving said transverse cutting members in order to cut said meat streams into a plurality of parallelepipedal pieces of meat.

4,995,804

APPARATUS FOR QUANTITATIVELY EXTRUDING FOOD MATERIAL

Koichi Hirabayashi, Utsunomiya, Japan, assignor to Rheon Automatic Machinery Co., Ltd., Tochigi, Japan

Filed Aug. 30, 1989, Ser. No. 400,798

Claims priority, application Japan, Oct. 4, 1988, 63-130038[U]

Int. Cl.[5] A21C *5/00, 11/16;* B29C *47/00*

U.S. Cl. 425—238 **8 Claims**

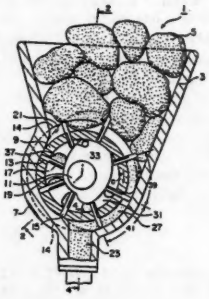
1. An apparatus for quantitatively extruding food material, comprising:

(a) a hopper for food material,

(b) an eccentrically formed cylindrical housing mounted on the bottom of said hopper, having a cylindrical side wall, which is open at the top part that faces the hopper, and two end walls, said housing being provided with a plurality of exit ports positioned away from said hopper and arranged on said cylindrical side wall in the axial direction of said housing,

(c) a rotating hollow cylindrical drum disposed in said housing, operatively connected to an axis, said axis in turn being connected to a motor, said drum having a plurality of slits formed radially through the peripheral body thereof and extending in the axial direction of said peripheral body, said side wall of said housing so formed that the periphery of said drum and the inner surface of said side wall of said housing downstream of said hopper in the direction of rotation of said drum defining a space progressively narrowing in its cross-section toward said exit ports, and slidably engaging each other downstream of said exit parts in the direction of rotation of said drum, said drum further having a plurality of flanges formed on the peripheral body thereof, and extending to engage the inner surface of said housing to divide said space into as many sections as the number of said exit ports, said sections communicating with the respective exit ports,

(d) a plurality of blades, inserted into each of said slits, and of cross-sectional dimensions defined such that they slidably fit in said slits, each said blade being provided with a recess on its trailing surface extending in the radial direction over a distance slightly greater than thickness of the peripheral body of said drum,



(e) an eccentric cylindrical cam mounted on said axis of said drum, the periphery thereof being radially spaced apart from the inner surface of said side wall of said housing by a distance equal to the radial width of said blades, engaging said peripheral body of said drum at the top portion of said drum and being progressively separated from said peripheral body in the direction of rotation of the drum defining an inner chamber together with the end walls of the housing, and enlarging in its cross-section toward said exit ports,

(f) an exit path connecting said inner chamber to said hopper,

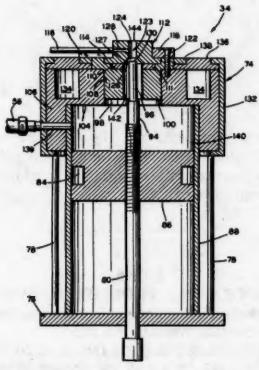
wherein each of said blades is slidably movable as said drum rotates along said periphery of said eccentric cam and said inner surface of said side wall of said housing, so that when the rotation brings said blade to face the bottom of said hopper the outward part of said blade is arranged to protrude into said hopper to introduce said food material into each of said sections of said space to said inner chamber for releasing into said inner chamber the air trapped in a compartment formed by said two adjacent blades and the drum, an adjacent pair of said flanges or one said flange and an end wall and the inner wall of said housing, and to retract to a point where the outward end of said blade becomes flush with the periphery of said drum when said blade has moved past said exit ports.

4,995,805

METHOD AND APPARATUS FOR INCREASING RADIANT HEAT PRODUCTION OF HYDROCARBON FUEL COMBUSTION SYSTEMS

John C. Hilliard, Ann Arbor, Mich., assignor to Gas Research Institute, Chicago, Ill.

Filed Feb. 24, 1989, Ser. No. 315,428
Int. Cl.[5] F23Q 3/00
U.S. Cl. 431—10 46 Claims



1. A combustion apparatus, comprising: a pair of spaced electrodes defining a gap; means for conveying an oxidant free fuel through said gap; means for establishing a continuous arc across said gap to pyrolytically form particles dispersed in such conveyed fuel, means for preventing the deposit of such pyrolytically formed particles on one of said electrodes; and means for combining an oxidant with the fuel and dispersed particles to form a combustible mixture having particles dispersed therein.

4,995,806

DEODORIZING DEVICE FOR OIL STOVES

Kenji Akita, Sakai, and Junji Aiga, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 45,283, May 4, 1987, abandoned, Division of Ser. No. 694,840, Jan. 25, 1985, Pat. No. 4,688,546.
This application May 22, 1989, Ser. No. 356,639
Claims priority, application Japan, Jan. 30, 1984, 59-12979[U]; Feb. 1, 1984, 59-13764[U]; Feb. 2, 1984, 59-14221[U]; May 15, 1984; 59-71331[U]; May 15, 1984; 59-71332[U]
2004, has been disclaimed.
Int. Cl.[5] F23N 3/00
U.S. Cl. 431—30 5 Claims

1. An oil stove device comprising:

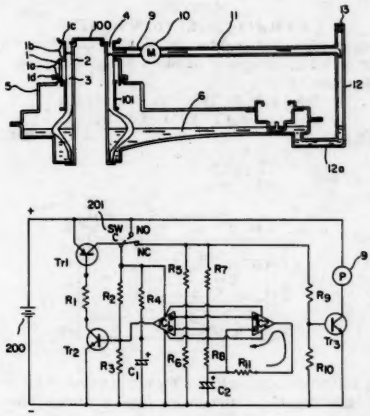
combustion means for burning fuel in response to a switch being moved to a combustion position for the generation of a flame and generating gases from said burning;

extinguishment means for extinguishing the flame in response to said switch being moved to an extinguishing position;

control means for generating a signal indicative of the position of said extinguishment means in response to the condition of said switch;

suction means for absorbing and removing the gases in proximity to the combustion means in response to the signal generated by said control means; and

timer means for operating the suction means for a predetermined period of time or until said switch is moved to said combustion position to enable the gases to be absorbed and removed in proximity to said combustion means and



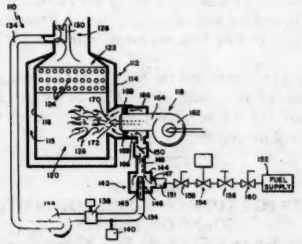
resetting said predetermined period of time when said switch is returned to said combustion position.

4,995,807

FLUE GAS RECIRCULATION SYSTEM

Thomas N. Rampley, and Paul G. Hoffarth, both of Peru, Ind., assignors to Bryan Steam Corporation, Peru, Ind.

Filed Mar. 20, 1989, Ser. No. 326,161
Int. Cl.[5] F23L 7/00
U.S. Cl. 431—9 13 Claims



13. A method of reducing the amount of nitrogen oxides produced and discharged by a boiler which includes a burner assembly, a combustion chamber, a flue for exhausting combustion product created by the burner assembly from the combustion chamber, and fuel supply means for supplying a fuel gas to the burner assembly, the method comprising the steps of:

providing a housing having a first inlet, a second inlet, and an outlet,

removing a portion of the combustion product from the flue,

introducing the portion of the combustion product removed from the flue into the housing through the first inlet,

introducing a fuel gas into the housing through the second inlet to produce a mixture of combustion product and fuel gas containing at least 30% combustion product,

connecting the output of the housing to the burner assembly to supply the mixture of combustion product and fuel gas to a firing head of the burner assembly,

monitoring the pressure of the portion of the combustion product delivered to the housing from the flue, and

stopping removal of the combustion product from the flue in

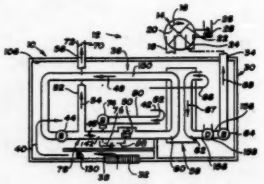
response to the pressure falling below a predetermined level.

4,995,808

CARBON DESORPTION HEATER

William B. Pink, Birmingham, and William G. Ickes, Warren, both of Mich., assignors to Sheet Metal Industries, Inc., Melvindale, Mich.

Filed Feb. 20, 1990, Ser. No. 481,981
Int. Cl.[5] F23J 15/00
U.S. Cl. 432—72 15 Claims



1. A carbon desorption heater for use in a system for removing volatile organic contaminants from a carbon filter, the heater comprising:

a housing having an inlet for receiving air to be heated and also having a supply outlet through which heated air is supplied to the carbon filter;

a recirculating heating circuit located within the housing, the heating circuit including a recirculation blower that moves air in a recirculating manner along the heating circuit and also including a burner that heats the air during its recirculating flow, and the heating circuit including an exhaust stack outlet through which a portion of the recirculating air is exhausted during each cycle of flow through the heating circuit;

a heat exchanger located within the housing and having a first flow path that is heated by the recirculating heating circuit, and the heat exchanger having a second flow path that is heated by heat exchange with the first flow path; and

a delivery blower within the housing for moving air through the second flow path of the heat exchanger for heating thereof and for supplying the heated air to the supply outlet of the housing.

4,995,809

BAFFLES FOR TUBE COOLERS, ROTARY TUBULAR KILNS OR THE LIKE

Ralf Filges, Bergisch Gladbach; Fred Klotmann, and Hans J. Wutschke, both of Cologne, all of Fed. Rep. of Germany, assignors to Kloeckner-Humboldt-Deutz Aktiengesellschaft, Fed. Rep. of Germany

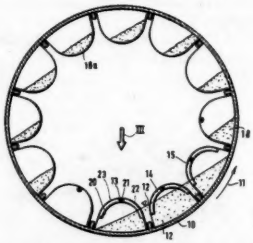
Filed Oct. 27, 1989, Ser. No. 427,505
Claims priority, application Fed. Rep. of Germany, Nov. 5, 1988, 3837607
Int. Cl.[5] F27B 7/14
U.S. Cl. 432—118 19 Claims

1. A mechanism for improved thermal energy transfer relative to a product within a rotary drum comprising in combination:

a rotary drum for a product subjected to tumbling therein for thermal energy transfer;

shaped baffles extending arcuately into the drum interior mounted on an inner surface of the drum with a concave surface facing outwardly of the drum interior and extending generally axially of the drum to carry the product tumbled within the drum;

said baffles defining a space limited inwardly by the arcuate baffles and outwardly by an interior surface of the drum, this space being permeated by gas within the drum and by lifted granular material product tumbled within the drum;



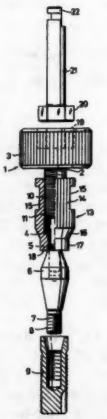
and surface constricting drum edges on the axial ends of the concave surface of the baffles constricting the inner area of the baffles preventing a product from being scattered axially from the baffles.

4,995,810

TOOL FOR A PROSTHETIC PART

Per Olof Söderberg, Stockholm, Sweden, assignor to Astra Meditec Aktiebolag, Molndal, Sweden

PCT No. PCT/SE88/00206, § 371 Date Oct. 20, 1989, § 102(e) Date Oct. 20, 1989, PCT Pub. No. WO88/08283, PCT Pub. Date Nov. 3, 1988
PCT Filed Apr. 22, 1988, Ser. No. 424,270
Claims priority, application Sweden, Apr. 22, 1987, 8701652
Int. Cl.[5] A61C 3/00
U.S. Cl. 433—141 2 Claims



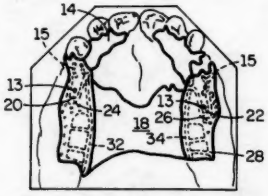
1. A tool for screwing into place a threaded prosthetic part (6), which tool comprises a turning bolt (1) which has an elongated cylindrical core (2) having at one end thereof a head (3) for turning the tool, and having at its opposite end a portion (4) with first threads (5) for fitting into threads in the prosthetic part, and having second threads (11) on a portion (10) thereof between the ends thereof, whereby a sleeve (13) is arranged around the core, said sleeve having threads engaging said second threads, whereby the sleeve may be screwed into contact with the prosthetic part (6) and to locking of the tool in the prosthetic part, characterized in the pitch direction of said second threads is opposite to the pitch direction of the first threads.

4,995,811

COMPONENT PART REMOVABLE PARTIAL DENTURE AND METHOD FOR DESIGNING AND MAKING SAME

Bert T. Cecconi, 3017 Charter Crest, San Antonio, Tex. 782230

Division of Ser. No. 119,659, Nov. 12, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 323,066
Int. Cl.[5] A61C *13/26*
U.S. Cl. 433—190 23 Claims



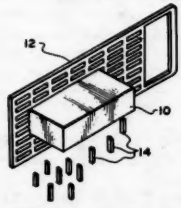
1. A method for designing and constructing a component part removable partial denture framework comprising the steps of:
- forming a model design of a partial denture in component parts on a master cast;
- making a wax pattern of said model design on an investment cast;
- forming castings on said wax pattern;
- finishing the castings in separate components;
- fitting the separate components on the master cast; and
- locking the components together to form a single component part removable partial denture framework.

4,995,812

METHOD OF OBTAINING USABLE HYDROCOLLOID IMPRESSION MATERIAL

Fred W. Reynolds, 1516 W. 1st St., #110, San Pedro, Calif. 90732

Filed Nov. 2, 1989, Ser. No. 430,296
Int. Cl.[5] A61C *9/00*
U.S. Cl. 433—214 4 Claims



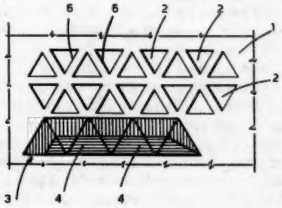
1. A method of obtaining usable hydrocolloid impression material comprising the steps of:
- acquiring a solid block of hydrocolloid at around room temperature;
- cutting said block into a mass of individual small parts;
- subjecting said parts to microwave energy for a predetermined length of time until said parts are completely melted and intermixed forming a homogeneous liquid mass at an elevated temperature;
- pouring said liquid mass into a tray;
- tempering said liquid mass to a temperature which would be acceptable to the tissue within the mouth of a human being;
- inserting said tempered mass and said tray into the mouth of the human being and applying said tempered mass against a particular area of the mouth to make an impression of the area of the mouth within said tempered mass; and
- utilizing of said impression to construct a dental appliance.

4,995,813

SYSTEM OF ELEMENTS FOR THE CREATION OF GRAPHIC COMPOSITIONS

Corrado Francioni, Via Stendha 7/A, 40128 Bologna, Italy

Filed Jun. 6, 1989, Ser. No. 362,101
Claims priority, application Italy, Jun. 9, 1988, 3499 A/88
Int. Cl.[5] G09B *19/00*
U.S. Cl. 434—96 11 Claims



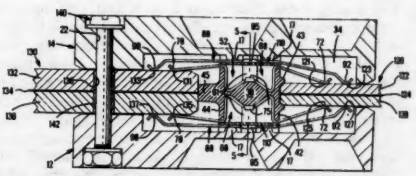
1. A system of elements for the creation of graphic compositions, comprising:
- a first element affording a plurality of sockets arranged horizontally and a plurality of sockets arranged vertically;
- a plurality of second elements provided obversely with a flat face of regular polygon-shape, said polygon-shape defining sides of the face, and reversely with a shank insertable individually in a matching fit in the sockets of the first elements, at least one of said second elements exhibits a flat face uniformly tinted in one of a select range of colors, or of polychrome or monochrome shadings, and wherein at least one other second element exhibits a flat face divided into at least two fields, each of which are uniformly tinted in a color or shading of the same range;
- wherein the sockets are arranged to match the geometry of the flat faces and set apart one from the next at a distance such that when the second elements are inserted into the sockets by way of their shanks, the flat faces are brought fully into contact one with the other so that the respective sides are adjoining, with no gaps remaining between them.

4,995,814

CONNECTOR FOR MATING BLADE-SHAPED MEMBERS

Charles H. Weidler, Lancaster, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 451,471, Dec. 15, 1989. This application Apr. 27, 1990, Ser. No. 515,400
Int. Cl.[5] H05K *1/00*
U.S. Cl. 439—61 9 Claims



1. An electrical connector for mating two blade shaped members, each having opposed first and second sides, said connector comprising:

a dielectric spacer member having opposed major surfaces extending between opposed first and second ends;

a plurality of discrete electrically isolated first terminal members and a least a plurality of discrete electrically isolated second terminal members secured to each of said opposing major surfaces of said spacer member for electrical interconnection of first and second electrical articles at leading and trailing edges respectively, said plurality of first terminal members being adjacent said spacer member and said plurality of second terminal members disposed outwardly of said first terminal members; and

means insulating associated said first and second terminal members from each other;

each said first terminal member including first and second cantilevered spring contact arms extending outwardly in opposite directions from an intermediate body portion, the plurality of first terminal members defining first and second arrays of contact arms extending from respective said opposed ends of said spacer member, the contact arms of each said first and second arrays of first terminal members extending to free ends outwardly from a plane of respective said intermediate portion toward a corresponding first and second contact arm array of first terminal members along a respective said major surface of said spacer member defining first and second blade receiving receptacles axially outwardly of said first and second spacer member ends;

each second terminal member including first and second cantilevered spring contact arms extending outwardly in opposite directions from an intermediate portion thereof, the plurality of second terminal members defining third and fourth arrays of contact arms extending from respective said opposed ends of said spacer member, said contact arms of both said third and fourth arrays extending to respective free ends outwardly from the plane of a respective said intermediate portion toward a corresponding contact arm array of said second terminal members along said end proximate said major surface of said spacer member, said fourth arrays being proximate and associated with said second arrays;

said spring contact arms of said third and fourth arrays being longer than the corresponding spring contact arms of said first and second arrays such that the free ends of the contact arms of said third arrays are disposed substantially coplanar with those of the associated first arrays and located axially outwardly therefrom thereby extending said first blade-receiving receptacle, and the free ends of the contact arms of said fourth arrays are disposed substantially coplanar with those of the associated second arrays and located axially outwardly therefrom thereby extending said second blade-receiving receptacle; whereby

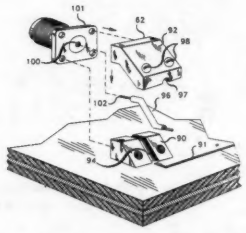
upon mating said connector with first and second blade-shaped members and outward deflection against spring bias of all said contact arms by said blade-shaped members, said first and third spring contact arm free ends engage said first blade-shaped member at a plurality of inner and outer locations along each said first and second sides thereof and said second and fourth spring contact arm free ends engage said second blade-shaped member at a plurality of inner and outer locations along each said first and second sides thereof, and each said first terminal member interconnects one of said first and second sides of said first blade-shaped member with a corresponding one of said first and second sides of said second blade-shaped member establishing a plurality of discrete current paths therealong, and each said second terminal member also interconnected one of said first and second sides of said first blade-shaped member with a corresponding one of said first and second sides of said second blade-shaped member along a plurality of inner and out locations along each said first and second sides thereof, establishing a plurality of isolated current paths therealong, all thereby lowering resistance.

4,995,815

COAXIAL TRANSMISSION LINE TO STRIP LINE COUPLER

W. A. Buchanan, E. Hampstead, N.H., and G. L. Heiter, Andover, Mass., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Feb. 26, 1990, Ser. No. 488,819
Int. Cl.[5] H05K *1/00*
U.S. Cl. 439—63 **5 Claims**



1. A coupler for coupling a coaxial transmission line to a controlled impedance strip transmission line of a type in which a sheet of dielectric material supports a strip signal conductor on one side and a ground plane on the other, comprising

an inner conductor having a longitudinal axis, a first end section and a second end section, the longitudinal axis of said first end section forming an obtuse angle with the longitudinal axis of the inner conductor,

an annular ring of dielectric material disposed around said inner conductor, and

an outer conducting member disposed around said dielectric material,

said coupler adapted to be coupled to the strip signal conductor side of said sheet of dielectric material intermediate the edges of said sheet of dielectric material,

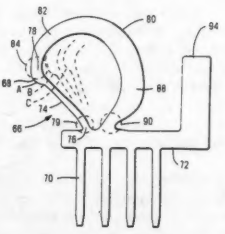
said first end section of said inner conductor projects beyond said annular ring of dielectric material and is adapted to be tangentially aligned with and coupled to said strip signal conductor on said sheet of dielectric material intermediate the edges of said sheet of dielectric material when said coupler is coupled to the strip signal conductor side of said sheet of dielectric material, and said outer conducting member is adapted to be coupled to said ground plane on the sheet of dielectric material.

4,995,816

PIVOTAL ELECTRICAL CONTACT

Dimitry G. Grabbe, Middletown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Sep. 29, 1989, Ser. No. 414,561
Int. Cl.[5] H01R *23/72*
U.S. Cl. 439—71 **11 Claims**



1. In a connector for providing an electrical path between a

contacting surface of a mating electrical component and a terminal of the connector, an electrical contact comprising:

(a) a base;

(b) a terminal projecting from said base;

(c) a cantilevered member having first and second ends, said first end projecting from said base through a first pivotal zone to said second end;

(d) a contact associated with said second end of said cantilevered member; and

(e) a spring member having a third end and a fourth end, said third end being pivotally associated by means of a second pivotal zone with said second end of said cantilevered member and said fourth end being pivotally associated by means of a third pivotal zone with said base at a point adjacent said first end of said cantilevered member, wherein said third and fourth ends are resiliently urged apart thereby causing said cantilevered member to pivot about said first pivotal zone urging said contact into engagement with said contacting surface.

4,995,817

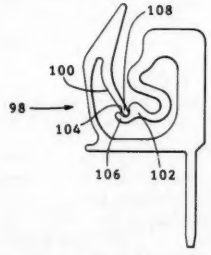
ELECTRICAL CONTACT

Dimitry G. Grabbe, Middletown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 395,621, Aug. 18, 1989, Pat. No. 4,959,029. This application Feb. 26, 1990, Ser. No. 485,337

Int. Cl.[5] H05K *1/00*

U.S. Cl. 439—71 **6 Claims**



6. A method for making an electrical contact, characterized by the steps of:

forming from a planar metal sheet a monolithic planar blank having a base, a first beam extending away from the base, a second beam extending from the distal end of the first beam toward the base, a support extending away from the base, and a third beam extending from the distal end of the support toward the base;

bending the first and third beams beyond their elastic limits each in a direction opposite to that in which the respective beams will be stressed when functioning as a contact; and

bending the first and third beams beyond their elastic limits each in the respective direction opposite to that of the preceding bending step so that the second and third beams engage for relative pivotal motion and remain pivotally engaged after the first and third beams are released to allow the electrical contact to resiliently assume its equilibrium position.

4,995,818

BUS BAR INTERLAYER CONNECTOR STRUCTURE IN JUNCTION BOX

Tetsuro Saimoto, Kosai, Japan, assignor to Yazaki Corporation, Tokyo, Japan

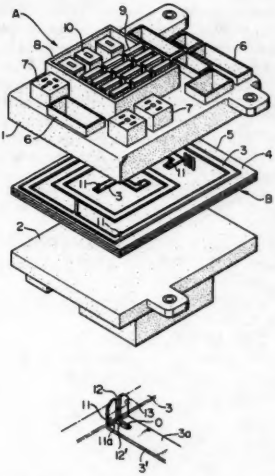
Filed Mar. 16, 1990, Ser. No. 494,416

Claims priority, application Japan, Mar. 17, 1989, 1-29782

Int. Cl.[5] H01R *9/09*

U.S. Cl. 439—74 **5 Claims**

1. A bus bar interlayer connector structure for use in a junction box, comprising a bus bar in one layer having a tab with a leading end portion formed with a longitudinal slit and bent at the central part of the slit at right angles to the bus bar body, and another bus bar in another layer having an elongated hole formed therein and adapted to be pierced with said tab for fixedly securing the latter, wherein said longitudinal slit extends past the bent base portion of the tab to a pattern portion of the bus bar in said one layer.



4,995,819

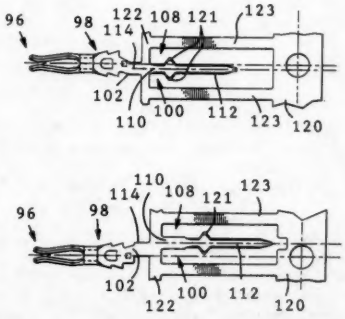
SET OF STRIPS OF ELECTRICAL TERMINALS AND A METHOD OF LOADING AN ELECTRICAL CONNECTOR WITH SAID TERMINALS

William C. Ohl, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 202,167, Jun. 3, 1988, abandoned. This application Sep. 15, 1989, Ser. No. 408,444

Int. Cl.[5] H01R *9/09*

U.S. Cl. 439—79 **3 Claims**



1. A set of eight strips of electrical terminals, the terminals of each strip being identical, connected together in spaced relationship by means of carrier strips, each strip of terminals being stamped and formed from a length of sheet metal stock and each terminal comprising an elongate mating part, having a forward and a rear end, a retention part for retaining the termi-

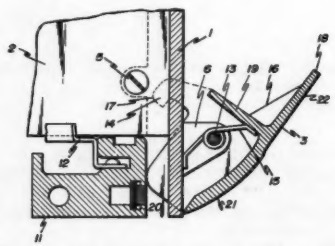
nal in a cavity in an insulating housing and having one end connected to the rear end of the mating part, a terminal leg extending parallel to the mating part and having, intermediate its ends, means for retaining said legs in a recess provided in the housing below said cavity and an arm cranked in the plane of the strip, connecting one end of said leg to said retention part and serving to laterally offset said leg from said mating part, wherein said terminal strips comprise four pairs of terminal strips, the arms of the terminals of each pair of terminal strips laterally offsetting the mating parts of the terminals of said pair from the legs thereof, in opposite directions, the legs of the terminals of a first of the pairs of terminal strips being of a first length, the legs of the terminals of second of the pairs of terminal strips being of a second length which is greater than the first length, the legs of one of the terminals of a third of said pairs being of said second length and the other leg of said third pair being of a fourth length, the legs of the terminals of the fourth of said pairs being of said fourth length which is greater than said third length.

4,995,820

SCREENING EDGE MASK FOR PRINTED CIRCUIT BOARD, WITH WITHDRAWING-RETAINING MECHANISM

Rafael R. Prados, Madrid, Spain, assignor to Telefonica De Espana, S.A., Madrid, Spain

Filed Dec. 18, 1989, Ser. No. 452,102
Claims priority, application Spain, May 10, 1989, 8901600
Int. Cl.[5] H01R *13/62*
U.S. Cl. 439—157 **12 Claims**



1. A screened edge mask for a printed circuit board, the mask comprising:

a T-sectioned strip with unequal flanges to which is attachable on one side a printed circuit board edge, and on the other side are mounted two withdrawing and retaining mechanisms for withdrawing or for holding the printed circuit board in an installed position on an equipment frame.

4,995,821

MODULE RETENTION/EJECTION SYSTEM

Daniel T. Casey, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

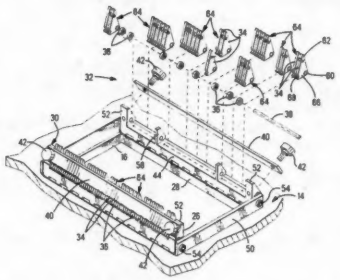
Filed Apr. 17, 1990, Ser. No. 510,371
Int. Cl.[5] H01R *13/62*
U.S. Cl. 439—157 **11 Claims**

1. A system for releasably retaining a plurality of modules in an array on a panel, comprising:

a pair of opposing assemblies secured to a panel at an array site, each assembly including at least a base member mounted against and along a surface of said panel, and each base member including a plurality of flange sections extending upwardly having aligned holes extending therethrough along which a shaft member is secured proximate said panel surface;

an array of cam lever members mounted in spaced relationship along said shaft member at each site of a module, said cam lever members each including a shaft-receiving aperture and coextending from said shaft member extending therethrough and away from said panel surface to respective free ends and reciprocally rotatably movable about said shaft member in a direction toward and away from the other said assembly, said cam lever members of both said assemblies being associated in opposing pairs at a said module site, and each said cam lever free end being adapted to be manually engaged to be rotated toward and away from the opposing said assembly between outward and inward positions;

each said cam lever member of each said pair including means for retaining a module in cooperation with retention means of said module laterally therealong when a said module is positioned in said array adjacent and between said pair of cam lever members and said cam lever members of said pair are rotated to respective said inward



positions, with said retaining means and said module retention means cooperating to retain said module in said fully mated condition; and

each said cam lever member of each said pair including a means for ejecting a module in cooperation with ejection means of a said module when said cam lever members of said pair are rotated to respective said outward positions,

whereby a said module is retainable in said array by a pair of opposing cam levers independently of other modules separate therefrom in said array and is easily removable from said array while other said cam lever members retain said other separate modules in said array, and is retainable by means alongside said modules and needing only limited height, and said array of modules is retainable adjacent said panel among a plurality of like adjacent arrays, eliminating the need for additional framework and facilitating access to said modules.

4,995,822

ELECTRICAL CONNECTOR

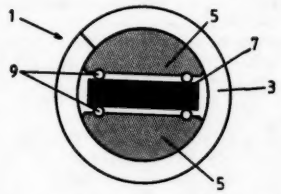
Thomas E. Borden, San Francisco, Calif.; Charles R. Nestor, Niles, Ohio, and David W. Solano, Troy, Mich., assignors to Raychem Corporation, Menlo Park, Calif.

Filed Jan. 26, 1990, Ser. No. 471,161
Int. Cl.[5] H01R *13/24*
U.S. Cl. 439—161 **10 Claims**

1. An electrical connector for making an electrical connection between at least two contacts, comprising:

(a) a driver assembly which comprises a driver which is capable of shrinking radially inwardly and of exerting a radially inward force, the assembly having two internal surfaces of insulating material which face one another and which are forced towards one another when the driver

shrinks said insulating material being plated onto the internal surfaces of the driver; and



(b) electrical contacts on the inner surface of the insulating material.

4,995,823

LIGHTING STRING

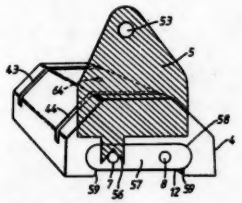
Rendell A. Morales, RZ Arnhem, Netherlands, assignor to Chainlight International S.A., Luxembourg, Luxembourg

Filed Feb. 16, 1989, Ser. No. 310,993

Claims priority, application Netherlands, Feb. 18, 1988, 8800417; Oct. 31, 1988, 8802658

Int. Cl.[5] H01R *4/24*

U.S. Cl. 439—226 **19 Claims**



1. A lighting string comprising two insulated electrical wires extending substantially parallel to and spaced from each other, and a plurality of lighting fixtures mounted on and spaced from each other along the length of the electrical wires and adapted to make electric contact with said wires, said fixtures serving to accommodate and electrically connect tubular lamps parallel to the electrical wires, each of said fixtures comprising a mounting block for accommodating said electrical wires and a pair of terminals for the lamps in the form of flat metal plates, the lower part of each terminal plate of each pair being accommodated in a respective mounting block in spaced relation and having means for cutting into the insulation of one of the electrical wires to make electrical contact with said wire, and the upper part of each terminal plate having means for holding and making electrical contact with a lamp.

4,995,824

LINE COUPLING DEVICE

Robert N. Falco, Indianapolis, Ind., assignor to Cabot Corporation, Waltham, Mass.

Filed Oct. 23, 1989, Ser. No. 425,623

Int. Cl.[5] H01R *13/28*

U.S. Cl. 439—290 **10 Claims**

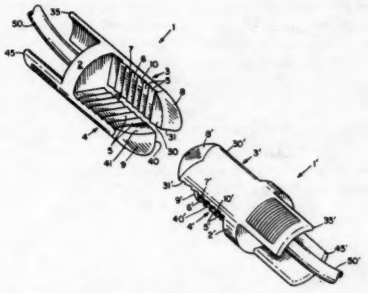
1. A line coupling device comprising two body components, each said body component comprising:

A. a resilient rear wall element;

B. at least two forwardly extending latching members supported by said rear wall element, said members being arranged parallel to and equidistantly spaced along their lengths from the longitudinal centerline of said body component, each of said members having a nose end,

(i) each of said members being of wedge-shaped cross section and defining a pair of convergent surfaces lying on radii of said longitudinal centerline, and

(ii) each said convergent surface having a plurality of latching teeth along the length thereof, the latching members of the one body component being interleavable with respect to the latching members of the other body component with the convergent surfaces of the latching members of the one body component being in at least light interference fit with respect to the corresponding adjacent convergent surfaces of the latching members of the other body component in the interleaved condition, thereby to engage the plural latching teeth of each of said convergent surfaces of the latching members of the one body component in cooperative latching engagement with the plural latching teeth of the corresponding convergent surfaces of the other body component; and



C. means for attaching line means to each said resilient rear wall element.

4,995,825

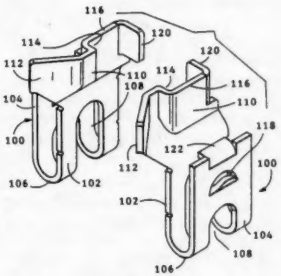
ELECTRONIC MODULE SOCKET WITH RESILIENT LATCH

Iosif Korsunsky, Harrisburg; Richard C. Schroepfer, Thompsontown, and James A. Leidy, Hummelstown, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 19, 1990, Ser. No. 495,886

Int. Cl.[5] H01R *13/62*

U.S. Cl. 439—328 **20 Claims**



1. A socket for interconnecting an electronic module to a circuit board, the socket comprising:

an insulative housing;

a plurality of terminals positioned within the insulative housing, the terminals being configured to establish electrical contact with the module upon rotation of the module to a first position, the terminals applying a moment to the module when the module is in the first position; and

means, located on at least one end of the housing, for holding

the module in the first position and resisting the moment applied to the module by the terminals;

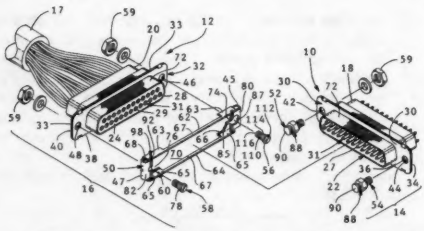
the means for holding the module being characterized in that said means comprises a U-shaped latch positioned within a pocket in the insulative housing, the U-shaped latch having inner and outer legs joined by a bight at the bottom of the U-shaped latch, the inner leg having a wedge shaped projection at its upper end, the outer leg being attached to the housing at a point adjacent the upper end of the U-shaped latch so that upon deflection of the U-shaped latch by engagement of the wedge shaped projection with the module during rotation of the module, the U-shaped latch is stressed between the wedge shaped projection and the point of attachment between the outer leg and the housing thereby forming a compliant spring.

4,995,826

CONNECTOR HAVING AN IMPROVED SLIDE LATCH AND A SLIDE LATCH MEMBER THEREFOR

Stephen B. Schieferly, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 18, 1989, Ser. No. 396,417
Int. Cl.[5] H01R *13/639*
U.S. Cl. 439—347 **15 Claims**



1. A latching member for mounting on a connector having slide latch securing means, the latching member movable laterally between a latched first position and an unlatched second position, the latching member comprising:

a base member defining first and second transverse end portions having side edges, said base member having an aperture adapted to receive a portion of the connector, and slot means proximate said aperture, said slot means adapted to receive the slide latch securing means as the latching member moves between the latched first position and the unlatched second position;

overturned extensions extending from the transverse end portions; and

side rails extending between said first and second transverse end portions and integral with side edges thereof, at least one of said side rails having means for cooperating with at least a respective one of said overturned extensions to prevent relative movement therebetween.

4,995,827

STRAIN RELIEF IDC CONNECTOR

Edward Rudoy, Woodland Hills, Calif., assignor to ITT Corporation, New York, N.Y.

Filed Jul. 16, 1990, Ser. No. 553,060
Int. Cl.[5] H01R *4/24*
U.S. Cl. 439—405 **8 Claims**

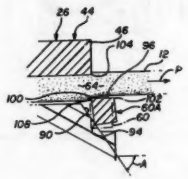
1. An insulation displacement connector for connecting to the conductors of cable wires comprising:

an insulative body having an upper end;

a plurality of contacts with portions lying in said body and with insulation displacement ends projecting from said body upper end;

a cap constructed to be pressed down toward said body upper end, to press the wires of a cable into said contact insulation displacement ends, said cap and body having a latch apparatus for holding said cap on said body;

said cap having a cover part with opposite sides and opposite ends, and at least one elongated cable support lying near a first of said cover part sides and extending parallel to said cover part side, said cable support spaced from said cover part by about the thickness of said wires, so said wires can



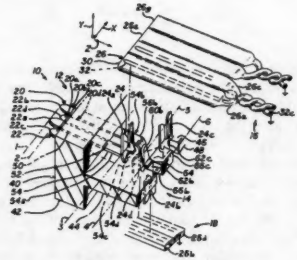
be threaded between said cover part and said cable support and under said cover part, said cable support being supported on said cover part to allow said cable support to be deflected closer to said cover part, and said body having a deflecting surface positioned to engage said cable support and deflect it relative to said cover part to squeeze said wires therebetween, whereby to provide strain relief.

4,995,828

CONNECTOR FOR PAIRED WIRE CABLE

David S. Goodman, Sun City West, Ariz., and Edward Rudoy, Woodland Hills, Calif., assignors to ITT Corporation, New York, N.Y.

Filed Apr. 12, 1990, Ser. No. 508,037
Int. Cl.[5] H01R *4/24*
U.S. Cl. 439—405 **6 Claims**



1. In a connector which has a connector mating end portion for mating with another connector by movement along a predetermined mating direction Z, and a wire termination end portion for connecting to two ribbon-like wire groups that have wires extending along said Z direction, with the wires in each group spaced apart along a direction X that is perpendicular to said direction Z and wherein the wires in each group include alternate grounded and signal-carrying wires, and wherein the connector includes a plurality of contacts that each has a wire termination end and a mating end, with the mating ends arranged in first and second rows wherein the contacts whose mating ends lie in the first row carry signals and the contacts whose mating ends lie in the second row are grounded, and wherein said first and second rows are spaced apart largely along a direction Y which is orthogonal to said directions Z and X, the improvement wherein:

said contacts are arranged in groups of four that include first, second, third, and fourth contacts having wire termination ends lying respectively in third, sixth, fourth and fifth rows, and mating ends lying respectively in said first row, first row, second row and second row;

said connector defining an imaginary centerplane that is normal to said Y direction and that has opposite sides, said third and fourth rows lying on one of said sides of said centerplane and being spaced apart along said Z direction, said fifth and sixth rows lying on an opposite side of said centerplane and being spaced apart in said Z direction;

said third and fifth rows being spaced apart largely in said Y direction, and said fourth and sixth rows being spaced apart largely in said Y direction.

4,995,829

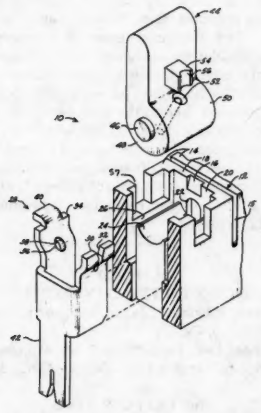
WIRE TERMINATION CONNECTOR AND TERMINAL BLOCK

Lawrence E. Geib, Carol Stream; William R. Bailey, Glen Ellyn, and James S. Zielinski, Roselle, all of Ill., assignors to Reed Devices, Inc., Carol Stream, Ill.

Filed Dec. 27, 1989, Ser. No. 457,572

Int. Cl.[5] H01R *4/24*

U.S. Cl. 439—409 **31 Claims**



1. An electrical connector for terminating an electrical conductor having a metallic core covered with insulation, comprising:

an insulative base housing comprising

a plurality of walls opposed in pairs, each of a pair of said walls having an angular notch providing a ramp from an upper end surface to an inner surface and a groove on said inner surface substantially the same width as said angular notch,

a support section recessed and intermediately bounded by said plurality of walls forming a terminal receiving cavity,

an electrically conductive terminal comprising

a first contact means for insulation displacement connection of said electrical conductor and a second contact means for feed-through and trimming of said electrical conductor, said first and second contact means joining with a lower-extending member and fitting slidably into said insulative base housing terminal receiving cavity, and

a non-conductive cam lever comprising

a lateral hub protruding from a first end and a second end of said cam lever,

a wire passageway extending through said cam lever substantially perpendicular to said lateral hub, said lateral hub of said first end and said second end of said cam lever mating with said groove on said inner surface of each of a pair of said walls and said wire passageway aligning with said first and second contact means, said cam lever being rotatable from a first position wherein said electrical conductor is installable through said wire passageway and said second contact means to a second position wherein said electrical conductor is trimmed by said second contact means and is connected to said first contact means.

4,995,830

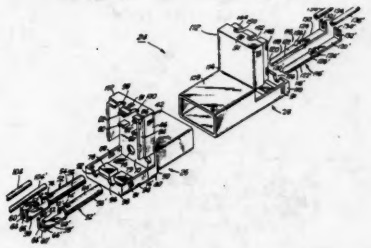
ELECTRICAL WIRE CONNECTORS

Ira Eckhaus, 1006 Neilson St., Far Rockaway, N.Y. 11691

Division of Ser. No. 99,351, Sep. 21, 1987, Pat. No. 4,859,203, Continuation-in-part of Ser. No. 864,435, May 16, 1986, Pat. No. 4,695,113, Continuation-in-part of Ser. No. 656,860, Oct. 2, 1984, abandoned. This application Aug. 20, 1989, Ser. No. 382,851

Int. Cl.[5] H01R *4/24*

U.S. Cl. 439—409 **24 Claims**



1. An electrical wire connector, comprising a housing assembly having a base portion and a closure portion, a receiving means associated with said housing assembly for receiving an insulated electrical wire, coupling means associated with said base portion for connection to another electrical member, slicing means on said base portion for transversely slicing the insulation so as to make electrical contact with the wire core therebeneath, connecting means for electrically connecting said slicing means with said coupling means whereby closure of said closure portion onto said base portion causes slicing of the insulation on the electrical wire to electrically connect the wire core and the other electrical member, and adjustment means associated with said slicing means for selectively adjusting a slicing opening on said slicing means to accommodate different gauge wires.

4,995,831

ELECTRICAL CONNECTOR SUPPORT

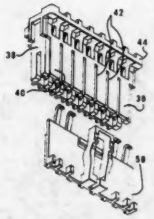
Mario Casagrande, Turin, Italy, assignor to AMP Incorporated, Harrisburg, Pa.

Filed May 26, 1989, Ser. No. 358,099

Claims priority, application United Kingdom, Jun. 3, 1988, 8813234

Int. Cl.[5] H01R *13/74*

U.S. Cl. 439—557 **5 Claims**



1. An electrical connector adapted to be secured to a surface such as a mounting board or connection support, wherein said connector comprises a housing with at least one major face, one or a row of elongate cavities therein opening to a cover

receiving end and a mating end, and a contact member for each said cavity for terminating a conductor, including the provision of a support having means for slidably engaging said major face, and one or more flexible arms, each said arm for engaging the housing through a respective opening along a shoulder portion of said major face adjacent said cover receiving end.

4,995,832

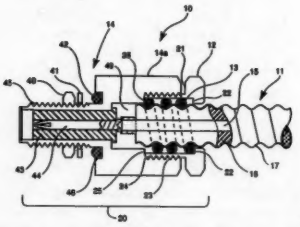
CONNECTOR FOR CONNECTING TO HELICALLY CORRUGATED CONDUIT

Robert L. Thommen, Indianapolis, and Jihan J. Mohammed, Greenwood, both of Ind., assignors to Specialty Connector Company, Inc., Franklin, Ind.

Filed Oct. 26, 1989, Ser. No. 427,585

Int. Cl.[5] H01R *17/04*

U.S. Cl. 439—578 **14 Claims**



1. A connector for connecting to helically corrugated conduit comprising:

a bolt member having a passageway therethrough;

a connector body having a hollow end portion for receiving the bolt member;

a helical spring within the passageway and adapted to be received within the helical corrugations of the conduit; and

means for forcing said bolt member into said hollow end portion to squeeze said spring between said bolt member and connector body whereby said spring is axially forced against the corrugations.

4,995,833

ROUND PLUG CASING FOR ELECTRICAL PLUGGING CONTACTS

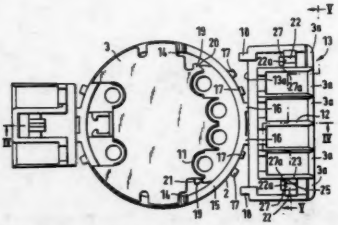
Frank Drecker, Remscheid, Fed. Rep. of Germany, assignor to Grote & Hartmann GmbH & Co. KG, Wuppertal, Fed. Rep. of Germany

Filed Jan. 18, 1990, Ser. No. 466,986

Claims priority, application Fed. Rep. of Germany, Jan. 26, 1989, 8900889[U]

Int. Cl.[5] H01R *13/40*

U.S. Cl. 439—596 **9 Claims**



1. Cylindrical round plug casing of plastic with a casing cylinder wall and a face wall, and chambers extending axially parallel in an interior thereof for an electrical plugging contact, the chambers are formed adjacent on a circular arc peripherally or adjacent to the cylinder wall, in which the chambers issue with an opening in the face wall and reach with their oppositely lying opening to about over a longitudinal middle of the round plug casing, and in which chamber walls are longitudinally divided beginning from the face wall to about half its length, a longitudinal half of the chambers is arranged on the cylinder wall and this zone of the cylinder wall is formed by two lateral separating joints extending axially parallel to each other beginning from the face wall, and a separating section extending from the one to the other separating joint, and by externally molded-on hinging strips bridging the separating section and attached to the cylinder wall and a hinged cover-type wall part piece, and supporting and resting means for preventing undesired opening of the wall part piece from the cylinder wall, the supporting means are adjacent the hinging strips and are formed of pin-form projections molded externally on the cylinder wall, overhanging the separating section, and strip-form projections formed laterally internally on a separating section edge of the hinged cover-type wall part piece, overhanging the separating section, gripping behind the cylinder wall internally, and the rest means include in each case a rest strip formed externally on an outer chamber wall of in each case a last outside chamber of a chamber series arranged on the circular arc, including several chambers, with an interior-side rest edge, which is gripped behind by a rest edge of a rest hook extending from the wall part piece to the interior, characterized in that on the wall part piece **(13)**, there is arranged a counter-bearing strip **(27)**, which in a swinging-to of the wall part piece **(13)**, grips under a counter-bearing surface **(19*a*)** of the rest strip **(19)** arranged on the outer chamber wall of in each case the last outside chamber **(7)** of the chamber series **(6)** in a zone of the respective separating joint **(14)**, virtually without play.

4,995,834

NOISE FILTER CONNECTOR

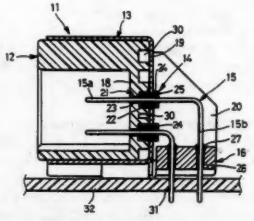
Izumi Hasegawa, Kawasaki, Japan, assignor to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 14, 1989, Ser. No. 450,694

Claims priority, application Japan, Oct. 31, 1989, 1-127460[U]

Int. Cl.[5] H01R *13/66*

U.S. Cl. 439—620 **5 Claims**



1. An electrical connector, comprising:

a dielectric housing having a dielectric rear wall through which holes extend, each said hole opening into a recess in said rear wall;

a metal shield case covering the outside of said housing;

a metal rear wall extending along the dielectric rear wall and having openings in alignment with the respective holes in said dielectric rear wall;

capacitors secured in said openings in said metal rear wall in electrical connection therewith with a section of each capacitor being disposed in said recess without engaging the walls of said recess; and

electrical contacts having contact sections extending through the capacitors in electrical connection therewith and extending through the respective holes in the dielec-

tric rear wall without engaging the walls of said holes and into said housing.

4,995,835

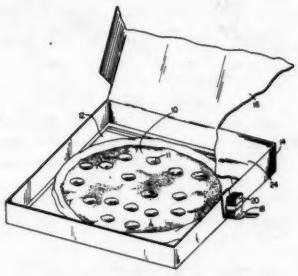
ELECTRICAL HEATER AND PLUG

Paul A. Cunningham, 118 West St., Attleboro, Mass. 02703, and Frederick G. J. Grise, 137 E. Bay Rd., Osterville, Mass. 02655

Continuation of Ser. No. 378,144, Jul. 11, 1989, abandoned, which is a division of Ser. No. 276,376, Nov. 23, 1988, Pat. No. 4,933,534. This application Nov. 27, 1989, Ser. No. 443,797

Int. Cl.[5] H01R *17/18*

U.S. Cl. 439—668 24 Claims



1. An electrical plug to be inserted into an automotive type cigarette lighter socket of the kind having an inner wall of a predetermined diameter and a pair of electrical contacts, comprising

a flat assembly including a flat substrate having a width corresponding to the predetermined diameter, and

a pair of flat conductors attached to the substrate for touching the pair of electrical contacts in the socket.

4,995,836

PIN PLUG CONNECTOR

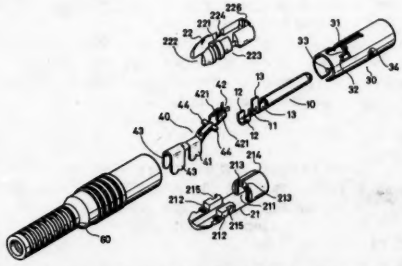
Hisao Toramoto, Kyoto, Japan, assignor to Hosiden Electronics Co., Ltd., Yao, Japan

Filed Nov. 1, 1989, Ser. No. 430,025

Claims priority, application Japan, Dec. 1, 1988, 63-157462[U]

Int. Cl.[5] H01R *17/18*

U.S. Cl. 439—675 3 Claims



1. A pin plug connector for connecting a coaxial cable having a core conductive line, an insulative layer covering the core line, and an outer conductive line lying outwardly of and around said insulative layer and around said conductive core, comprising:

a body of an insulative material;

a cover disposed in surrounding relation to said body and being connectable electrically with said outer conductive line;

a pin connectable with said core conductive line, said pin comprising a first press fitting means for press fitting around said core conductive line and clamping means for clamping around said insulative layer;

a terminal connectable with said outer conductive line and said cover, said terminal comprising second press fitting means for press fitting around said outer conductive line, said insulative layer and said core conductive layer and in electrical contact with said outer conductive line, said terminal including connecting end means for connecting with a mating end, of said cover;

said body comprising means for receiving said pin and said terminal therein such that said cover is slidable over said body for connecting said connecting end means on said terminal with said mating end on said cover.

4,995,837

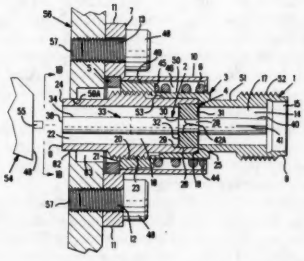
PRECISION TEST CONNECTOR

William D. Couper, and George W. Michael, both of Harrisburg, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 400,619, Aug. 30, 1989, Pat. No. 4,936,800. This application May 8, 1990, Ser. No. 520,492

Int. Cl.[5] H01R *13/00*

U.S. Cl. 439—863 9 Claims



1. An electrical precision test connector assembly comprising an electrical conductor with conductive end portions and a hollow shell encircling the electrical conductor;

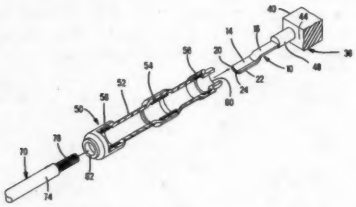
wherein the electrical conductor comprises slotted contact end part with flat, opposing electrical contact surfaces and said portion being pinched for a slideable, clamping engagement, above and below, with an inserted tab lead to thereby maintain flat, biased electrical contact above and below a portion of the lead; the hollow shell comprises rear contact surface encircling the slotted contact end portion of the conductor and said rear contact surface having a profile with flat surfaces for fit to corresponding flat surfaces of the port of a fixed plate to prevent rotational movement of said electrical conductor within said port; and the test connector assembly further comprises a spring means positioned against the shell and biasing the shell into complete electrical contact of the rear contact surface with a corresponding body of a component which is to be tested;

4,995,838

ELECTRICAL TERMINAL AND METHOD OF MAKING SAME

Kenneth N. Ayer, Hummelstown, and James P. Scholz, New Cumberland, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 277,094, Nov. 29, 1988, Pat. No. 4,852,252, and a continuation-in-part of Ser. No. 375,787, Jun. 30, 1989. This application Jul. 27, 1989, Ser. No. 385,643
The portion of the term of this patent subsequent to Aug. 1, 2006, has been disclaimed.
Int. Cl.[5] H01R *43/02, 4/02*
U.S. Cl. 439—874 6 Claims



1. An electrical terminal of the type including a conductor-terminating portion having a conductor-proximate surface and a conductor-remote surface, with the conductor-proximate surface adapted to facilitate solder termination to a conductive section of an electrical conductor means, the conductor-terminating portion being formed of a low resistance metal having minimal magnetic permeability, characterized in that:

said conductor-remote surface has joined thereto a substrate at least including a layer of magnetic material in a manner assuring good thermal conductivity therebetween, said magnetic material having high electrical resistance and high magnetic permeability, said layer having a thickness approximately equal to one skin depth of said magnetic material corresponding to a frequency of a source for generating a constant amplitude high frequency alternating current of known frequency, defining a self-regulating temperature source capable of being induced by the known-frequency current to generate thermal energy to attain and maintain a selected temperature; and

said joint of said substrate and said conductor-remote surface being a solder joint of solder having a sufficiently high reflow temperature not to be reflowable by said self-regulating temperature source when actuated by said known-frequency current,

whereby said electrical terminal includes an integral self-regulating temperature source defined by said conductor-terminating portion and said substrate soldered thereto to melt solder having a reflow temperature at least lower than said selected temperature to terminate a conductive section of the conductor means to the conductor-terminating portion.

4,995,839

APPARATUS FOR AUTOMATICALLY RAISING AND LOWERING BOAT MOTORS

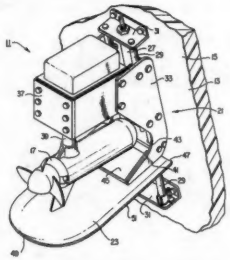
Felton H. Havins, 300 NE. 6th St., Fort Worth, Tex. 76106

Filed Dec. 13, 1988, Ser. No. 283,587
Int. Cl.[5] B63H *5/12*
U.S. Cl. 440—6 18 Claims

1. An apparatus for automatically raising first propulsion means on a boat, said boat having second propulsion means, comprising:

(a) mounting means for mounting said first propulsion means to said boat such that said first propulsion means can move between a submerged position and an unsubmerged position when said boat is in the water;

(b) hydrofoil means for raising said first propulsion means from said submerged position to said unsubmerged position when said boat is being propelled by said second propulsion means, said hydrofoil means being coupled to said mounting means, said hydrofoil means being adapted to be submerged when said first propulsion means is in the submerged position;



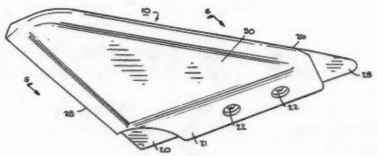
(c) said mounting means providing for movement of said hydrofoil means and said first propulsion means such that said hydrofoil means maintains a relatively constant orientation with respect to a waterline of said boat so as to present minimal drag when said first propulsion means is in the unsubmerged position.

4,995,840

STABILIZING FIN FOR A MOTOR BOAT

Robert Seale, Peekskill; Dennis Rizzuto, Spring Valley, and Harold Satin, New City, all of N.Y., assignors to Hydrofoil International, Inc., Crompond, N.Y.

Filed Aug. 4, 1989, Ser. No. 389,497
Int. Cl.[5] B63H *1/18*
U.S. Cl. 440—66 12 Claims



1. A stabilizing fin for a motor boat comprising

a first side having a longitudinally extending slot for mounting on a cavitation plate on a motor post;

a second side extending angularly of said first side and having a tapered leading edge;

a trailing side extending perpendicularly from said first side and having a thickened trailing edge; and

a recess in a bottom surface extending between said leading edge and said thickened trailing edge.

4,995,841

WATER SKIER'S SAFETY SYSTEM

Donald R. Coffey, 18801 N. 50th Ave., Glendale, Ariz. 85308

Filed Jun. 30, 1989, Ser. No. 373,567
Int. Cl.[5] B63C *9/20*
U.S. Cl. 441—11 9 Claims

1. A water skier safety system comprising:

a multiple section flag pole, the multiple sections of said flag pole being disposed in a minimal dimension for transport, and joined to form a flag pole of extended length;

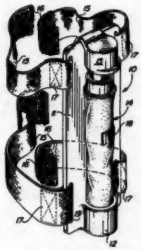
a signal flag coupled to said flag pole and furled about said flag pole when said flag pole is in its minimal dimension for transport, and displayed from said flag pole when said flag pole is in its extended length, said flag pole in its

extended length being hand manipulatable to wave said pole from the end of a person's arm to display said flag above the head of a person;

a holster base for transporting said flag pole and said signal flag when said base is coupled to the limb of a person;

means coupled to said base for coupling said base to the limb of a person;

a holster pocket coupled to said holster base for carrying



said flag pole, in its minimal transport dimension with said furled flag, while said base is coupled to a limb of a person; and

quick release means coupled to said holster base for maintaining said flag pole and said flag carried by said holster pocket during transport on a limb of a person and for quickly releasing said flag pole and said flag from said pocket when a person wishes to manipulated said flag pole in its extended length to display said flag.

4,995,842

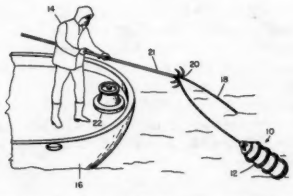
BUOY WITH REDUCED DRAG

Knut Beyer-Olsen, 17 Cascade Key, Bellevue, Wash. 98006

Filed Dec. 7, 1988, Ser. No. 280,888

Int. Cl.[5] B63B *22/18*

U.S. Cl. 441—22 **10 Claims**



10. A buoy attachable to a line for use upon the surface of a body of water, comprising:

an elongated flotational body having an end located upon a longitudinal axis thereof, the end having a hole sized to receive the line therethrough and fixably attach the line to the body, the body having a coefficient of drag when pulled upon the surface of the body of water by the line fixably attached to the body; and

at least one outwardly projecting circumferential rib oriented substantially perpendicular to the longitudinal axis, the rib circumferentially extending substantially continuously about the body and projecting outward an amount sufficient to ruduce the coefficient of drag of the body when pulled upon the surface of the body of water by the line fixably attached to the body.

4,995,843

SURFBOARD

Dirk Englemann, Am Fuchsbau 5, D-1000 Berlin 27, Fed. Rep. of Germany

PCT No. PCT/DE87/00121, § 371 Date Sep. 16, 1988, § 102(e) Date Sep. 16, 1988, PCT Pub. No. WO87/05526, PCT Pub. Date Sep. 24, 1987

PCT Filed Mar. 19, 1987, Ser. No. 273,816

Claims priority, application Fed. Rep. of Germany, Mar. 21, 1986, 3610043; Oct. 17, 1986, 3635802

Int. Cl.[5] A63C *15/00*

U.S. Cl. 441—74 **21 Claims**

1. A surfboard having an aft region terminating in a flexible tongue having a top, a front and a rear end, said flexible tongue disposed on the underside of said aft region of said surfboard; an elastic covering over the top of said flexible tongue; two supports arranged in succession above said flexible tongue and oriented relative to each other in the longitudinal direction of said tongue, one of said supports being a rear vertical support located proximate the rear end of said tongue and mounted inflexibly against said tongue, the other of said supports being a front vertical support mounted inflexibly to said surfboard; and elastic means including a stringer for elastically inter connecting said two supports, said elastic means operatively cooperating with said tongue for influencing the elastic deformation of said tongue.

4,995,844

BUBBLE BLOWING FIGURE TOY

John P. McNett, Farmington, and Sal Mucaro, Burlington, both of Conn., assignors to Tiger Electronics, Inc., Vernon Hills, Ill.

Filed Dec. 1, 1989, Ser. No. 444,515

Int. Cl.[5] A63H *33/28*

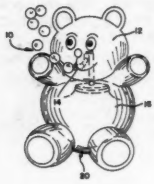
U.S. Cl. 446—021 **8 Claims**

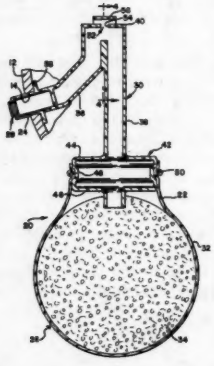
1. A bubble blowing figure toy comprising:

a hollow torso configured with a head portion and a squeezable body portion, said head portion defining a mouth opening; and

bubble blowing means arranged substantially within said hollow torso for generating bubbles from a bubble forming liquid, said bubble blowing means comprising collapsible air bladder means arranged within said hollow torso for generating a stream of air and defining an air supply end of said bubble blowing means, mouthpiece means positioned at the mouth opening of said torso and defining an air discharge end of said bubble blowing means, said mouthpiece means including an apertured mouthpiece defining a series of through-holes at a first end thereof and to which bubble forming fluid is applied, and elongated air duct means connected at a first end to said mouthpiece and at a second end to said air bladder means for directing a stream of air generated by said collapsible air bladder means toward and for positioning and holding said mouthpiece means at the mouth opening of said hollow torso such that it appears that bubbles are being blown from the mouth opening of the doll, said air duct means being configured between the ends thereof to inhibit ingestion of said bubble forming liquid into said air bladder means, and wherein application of said bubble forming liquid to the first end of said mouthpiece produces a meniscus diaphragm of bubble forming liquid across the aperture defined thereby with additional bubble forming liquid being extracted from said through holes by cohesion with the meniscus diaphragm thereby enhancing capacity of the

meniscus diaphragm to produce either a large bubble or a continuous stream of generally uniform bubbles emanating from the mouthpiece depending upon volume and pressure of the air stream generated by collapsing said air bladder means.





4,995,845

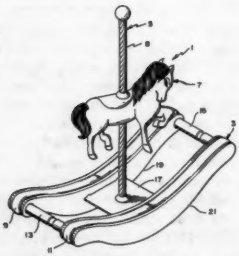
ROCKING DISPLAY ASSEMBLY

Jack Hou, P.O. Box 78-5, Taipei, Taiwan

Filed Jan. 19, 1990, Ser. No. 467,172

Int. Cl.[5] A63H *13/18, 1/06, 13/20*

U.S. Cl. 446—325 **2 Claims**



1. A rocking display unit comprising:

(a) a cylindrical support rod including a first end and a free second end;

(b) a base assembly including a pair of rocker members having bottom surfaces configured for engaging a support surface and imparting a rocking motion to the base assembly, a pair of cylindrical cross braces secured to opposite ends of the rocker members for maintaining same in a parallel spaced disposition, and a cross plate extending across and secured to the rocker members substantially midway between the opposite ends thereof, the cross plate being provided with a central aperture therethrough;

(c) the first end of the support rod further including a reduced diameter section defining an annular wall section and terminating in a threaded section, the reduced diameter section being disposed through the central aperture, a washer slidably received on the reduced diameter section and disposed in engagement with the annular wall section and cross plate, and a corresponding threaded means disposed in threaded engagement with the threaded section; and

(d) a hollow ornament including a pair of apertures formed in opposed wall portions thereof, lead aperture including a periphery, the support rod being received through both apertures, and the periphery of one aperture being engaged within the annular groove of the grommet.

4,995,846

TOY FIGURE WITH PIVOTAL LOWER TORSO

James F. Mariol, Cincinnati, Ohio, assignor to The Little Tikes Company, Hudson, Ohio

Filed Feb. 2, 1990, Ser. No. 474,570

Int. Cl.[5] A63H *3/46, 3/36*

U.S. Cl. 446—376 **12 Claims**

1. In a toy figure having upper and lower torso sections pivotally connected along a plane intersecting a longitudinal axis of said figure at a predetermined angle, whereby making said figure convertible from a standing configuration to a sitting configuration by rotating said torso sections 180 degrees with respect to one another, the improvement comprising:

a directionally oriented head component mounted to an upper end of said torso section;

said plane between said upper and lower torsos extending downwardly from a front to a back of said figure in said standing configuration, said bottom torso by directionally configured so that said bottom torso is directionally compatible with said upper torso and said head component when reconfigured to either said standing or said sitting configurations.

4,995,847

BALANCE TYPE MINUTE LENGTHENABLE ADJUSTER

Ying Teh Hwang, No. 220, Ruey Feng St., Kaohsiung, Taiwan

Filed Oct. 20, 1989, Ser. No. 424,737

Int. Cl.[5] A41C *3/00*

U.S. Cl. 450—71 **5 Claims**

1. A balance type minute lengthenable adjuster comprising:

(a) a left band ring and a right band ring;

(b) a left band and a right band, each band including a terminal end connected, respectively, to the left band ring and the right band ring;

(c) a continuous adjusting band passing through the left and right band rings, the band including a left end portion and a right end portion;

(d) a band pincher including a short tube having a substan-

tially rectangular cross section for receiving the adjusting band therethrough and a positioning flap pivotally connected to a top edge of the short tube for pinching the adjusting band between the flap and an outer surface of the short tube;

(e) a buckle including a left buckle ring and a right buckle ring, the left buckle ring having a pushing chip at a side thereof, the left end portion of the adjusting band being passed through the short tube and the left buckle ring and folded back onto itself and pinched between the positioning flap and the outer surface of the short tube, and the

right buckle ring being secured to the right end portion of the adjusting band; and

(f) whereby when the positioning flap is released from the left end portion of the adjusting band, the latter may either be pulled out through the left buckle ring to shorten the distance between the left and right band rings or released back through the left buckle ring to increase the distance between the left and right band rings, and thereafter secured in a desired position of adjustment by pitching the left end portion between the positioning flap and outer surface of the short tube.

4,995,848

COIN SORTERS

David Goh, Telford, England, assignor to Scan Coin AB of Jagershillgatan 26, S-213, Malmo, Sweden

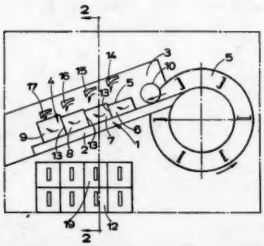
PCT No. PCT/GB88/00274, § 371 Date Nov. 17, 1989, § 102(e) Date Nov. 17, 1989, PCT Pub. No. WO88/08174, PCT Pub. Date Oct. 20, 1988

PCT Filed Apr. 8, 1988, Ser. No. 424,223

Claims priority, application United Kingdom, Apr. 9, 1987, 8708555

Int. Cl.[5] G07D *3/12*

U.S. Cl. 453—3 **3 Claims**



1. A coin sorter comprising a ramp (1) which is adapted to be inclined in use and to be fed at its upper end with coins (10) of mixed types such that the coins proceed on edge down a coin edge support surface (2) of the ramp, in which the ramp is provided with a coin face support surface (3) for supporting one face of the coins as the coins proceed down the ramp, the coin face support surface being provided with aperture means comprising aperture portions (6, 7, 8, 9) of different widths in the direction normal to the direction of the coin edge support surface, the widths increasing towards the lower end of the ramp whereby some coins, depending on their diameters in relation to the transverse dimensions of the aperture portions, will fall through corresponding aperture portions, characterised in that the ramp (1) also comprises a plurality of coin deflecting members (14, 15, 16, 17) spaced apart along the ramp and located at different distances from the coin edge support surface (2), the distances decreasing in the direction from the upper end of the ramp to the lower end of the ramp, the coin deflecting members being so arranged that some coins, in dependence on their diameter, engage with a corresponding deflecting member and are deflected away from the coin face support surface to fall from the ramp.

4,995,849

FORK FOR CARDAN JOINTS AND METHOD OF FORMING SAME

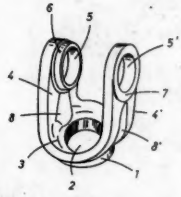
Melchor D. Castellon, Disputacion, 455, 080103 Barcelona, Spain

Continuation of Ser. No. 117,297, Nov. 6, 1987, abandoned. This application Oct. 25, 1989, Ser. No. 427,948

Claims priority, application Spain, Nov. 6, 1986, 86/03090

Int. Cl.[5] F16D *3/26*

U.S. Cl. 464—134 **6 Claims**



1. A fork for cardan joints, having a single-piece body of stamped sheet metal, comprising:

a cylindrical collar portion;

means on said collar portion for coupling the fork to the end of a corresponding shaft;

a dome portion having an arched generatrix and extending completely around the circumference of the fork, the dome portion being coaxial with said collar portion;

two symmetrical substantially flat and parallel wing-like arms extending from respective diametrically opposite positions of said dome portion without a break, and having free outer ends, said dome portion connecting said arms to said collar portion;

individual circular, mutually aligned flanged apertures through said free outer ends; and

a central longitudinal rectilinear rib of U-shaped cross-section and of large size extending centrally along each of said arms from proximate each aperture thereof and along said dome portion to proximate said collar portion.

4,995,850

HOMOKINETIC COUPLING HAVING A GUIDING DEVICE HAVING A RADIAL SPRING FORCE ACTION

Ernst van der Drift, and Hendrikus J. Kapaan, both of Nieuwegein, Netherlands, assignors to SKF Industrial Trading and Development Company B.V., Nieuwegein, Netherlands

Filed May 23, 1989, Ser. No. 360,760

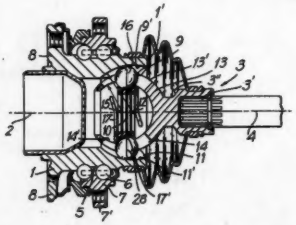
Claims priority, application Netherlands, May 31, 1988, 8801394

Int. Cl.[5] F16D *3/24*

U.S. Cl. 464—143 **1 Claim**

1. Homokinetic coupling for coupling two components, in particular a rotating drive shaft having a cardioid and a rotatable means to be rotated having a cardioid, in such a manner that said components can be swiveled from a position in which their cardioids are located in each other's extension to a position in which the cardioids are at an angle to one another, in-

cluding an outside coupling part having the shape of a housing which is connected to one of the two components so that the cardioid of the housing coincides with the cardioid of the rotatable means, and which on one side has a cavity open to the outside and bounded by part of a spherical portion having a wall with a spherical surface, whereby the center of the spherical portion coincides with the point at which the cardioids intersect, and an inside coupling part including a generally spherical end portion located concentrically inside the cavity, which spherical end portion is connected to said two components so that their cardioids coincide, whereby in the wall of the cavity of the outside coupling part a number of grooves are disposed in the direction of the cardioid of the housing the bottoms of which each follow the course of the arc of a circle, whereby the common center of the arcs is located on the extension of the cardioid of the housing at a distance from the center of the spherical surface of the spherical portion, and disposed inside the spherical end portion of the inside coupling part are an equal number of grooves cut in the direction of the cardioid of said inside coupling part, the lower boundaries of



which follow the course of arcs of circles whose common center is located on the extension of the cardioid of the inside coupling part at a distance from the center of the spherical surface of the spherical portion, and wherein an equal number of torque-transferring elements are disposed, in particular balls, which are each disposed partially in a groove in a wall of the spherical portion and disposed partially in a corresponding groove in the spherical end portion, whereby said torque-transferring elements interact with a guiding means so that the centers of the torque elements are disposed in a plane which is perpendicular to the plane of the cardioids, characterized in that the lower ends of the grooves in the spherical end portion are open so that the torque-transferring elements disposed therein project inward, and the guiding means comprises a helical coil tension spring disposed concentrically inside the cavity and mounted inside the spherical end portion shaped to define an annular groove along its circumference for containing the inwardly projecting portions of the torque-transferring elements, the tension spring providing a spring force directed radially outward on said torque elements.

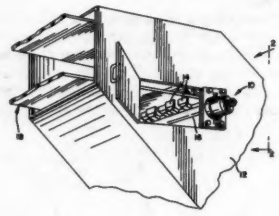
4,995,851

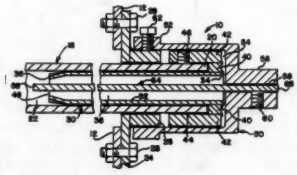
SPRING STEEL TENSIONER

Dennis E. Taylor, Kewanee, Ill., and Larry J. Goldbeck, Comanche, Iowa, assignors to Martin Engineering Company, Neponset, Ill.

Filed Aug. 2, 1990, Ser. No. 561,969
Int. Cl.[5] F16H *7/08*
U.S. Cl. 474—101 **6 Claims**

1. A tensioning arrangement for imparting torsional bias to a support shaft rotatable within a fixed frame including biasing means adapted to extend into the shaft for imparting torsional bias thereto, said biasing means having a first end, means for coupling said biasing means and the shaft for conjoint rotation, a hub member connectable to said first end of said biasing means, said hub member being relatively rotatable with respect to the fixed frame such that rotation of said hub member is operative to impart a torsional biasing force on the shaft, and fastening means for selectively connecting said hub member to





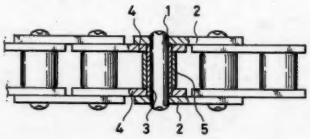
the fixed frame after a torsional biasing force is imparted to said shaft.

4,995,852

SINTERED OIL-RETAINING BUSHED CHAIN HAVING ROLLER

Toshio Takahashi, Osaka; Kazumasa Matsuno, Hyogo; Masaru Morimoto, and Fumio Ochiai, both of Osaka, all of Japan, assignors to Tsubakimoto Chain Co., Japan

Filed Sep. 14, 1988, Ser. No. 245,326
Claims priority, application Japan, Apr. 6, 1988, 63-45729[U]
Int. Cl.[5] F16G *13/08*
U.S. Cl. 474—91 **3 Claims**



1. An improved chain comprising inner link plates, sintered oil-retaining bushings secured to the inner link plates, outer link plates, connecting pins secured to the outer link plates and the pins being rotatable within the bushings, the improvement comprising:

the sintered density of the bushings being in the range of approximately 6.0 g/cm^3 to 7.1 g/cm^3; and,

a roller rotatably supported on each bushing,

wherein the wall thickness of the bushings is greater than the wall thickness of the rollers by a factor in the range of 110% to 140%.

4,995,853

PLUNGING CONSTANT VELOCITY RATIO UNIVERSAL JOINT

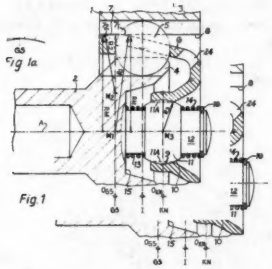
Peter Schwärzler, Glattbach; Hans Wormsbächer, Dreieich, and Rudolf Beier, Offenbach am Main, all of Fed. Rep. of Germany, assignors to Lohr & Bromkamp GmbH

Filed Jun. 8, 1989, Ser. No. 363,152

Claims priority, application Fed. Rep. of Germany, Jun. 8, 1988, 3819528

Int. Cl.[5] F16D *3/223*

U.S. Cl. 464—144 18 Claims



1. A plunging constant velocity ratio universal joint, comprising:

an outer joint member having an internal cylindrical surface provided with a number of tracks spaced circumferentially about a rotational axis of the joint member;

an inner joint member provided with a number of tracks spaced circumferentially about a rotational axis of the inner joint member, facing the tracks in the outer joint member in pairs;

a plurality of balls for torque transmission between the joint members, disposed one in each facing pair of said tracks;

and a cage having an axis and disposed between the joint members and holding the balls so that their centres lie in a ball centre plane, the cage having a first control surface which is in sliding engagement with the internal cylindrical surface of the outer joint member, and is a surface of revolution about the cage axis of a curved line with a centre of curvature axially offset from the ball centre plane, the cage further having a second control surface which is in sliding engagement with a surface associated with the inner joint member and is a surface of revolution about the cage axis of a curved line with a centre of curvature offset from the ball centre plane on the opposite side thereof from the first control surface, the said offset of the first control surface being greater than the said offset of the second control surface;

wherein the first control surface of the cage comprises a first portion, adjacent the ball centre plane, which is part-spherical, and a second portion extending from the first portion towards the end of the cage away from the ball centre plane, on which second portion all points are at distances from the cage axis less than the distances from the cage axis of corresponding points on a theoretical continuation of the first said surface portion towards the end of the cage.

4,995,854

TENSIONER FOR A CHAIN, BELT OR THE LIKE

Juji Ojima, Aikawa, Japan, assignor to NHK Spring Co., Ltd., Yokohama, Japan

Filed Nov. 28, 1989, Ser. No. 442,147

Claims priority, application Japan, Dec. 7, 1988, 63-309617

Int. Cl.[5] F16H *7/08*

U.S. Cl. 474—111 9 Claims

1. A tensioner for a chain, belt or other endless drive member wherein a male screw member and a female screw member are provided within a casing in a screwed state, the male screw member is rotated by a spring force to advance the female screw member in an axial direction, a cap is secured to the top end of the female screw member and said cap has an internal cavity defining an oil sump for storing lubricant oil therein said cavity having a diameter substantially conforming to an inner thread diameter of the male screw number.

4,995,855

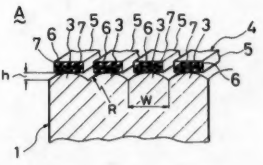
FLAT BELT TRANSMISSION

Kanteru Hasebe; Hiroshi Matsuoka, and Kyotaro Yanagi, all of Kobe, Japan, assignors to Bando Chemical Industries, Inc., Kobe, Japan

Filed Aug. 11, 1989, Ser. No. 392,284

Int. Cl.[5] F16H *7/02*

U.S. Cl. 474—167 6 Claims



1. A flat belt transmission comprising:

two spaced flat pulleys and a flat belt reeved around said pulleys, said flat belt comprising a belt body having a plurality of endless cores and having at least one trench with a predetermined depth extending in the longitudinal direction of the belt in the inner peripheral surface of said belt body which is in contact with said pulleys and dividing said belt body into belt parts; and

each flat pulley having at least two crowns on the outer periphery thereof each having a cross-section in the shape of an arc in the width direction of the outer periphery of the pulley and spaced in the width direction of the outer periphery of the pulley;

said belt parts engaging corresponding crowns for spreading the bearing stress in said belt parts from a peak value at the center to a low value at the edges.

4,995,856

VENTRICULOSTOMY RESERVOIR

Alfons Heindl; Stephen W. Laguette, both of Goleta, and Leanne M. Lintula, Santa Barbara, all of Calif., assignors to Pudenz-Schulte Medical Research Corporation, Goleta, Calif.

Filed Jun. 14, 1989, Ser. No. 365,906

Int. Cl.[5] A61M *5/00*

U.S. Cl. 604—8 35 Claims

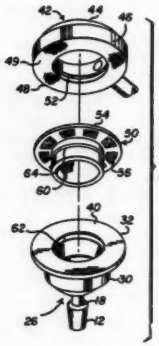
1. A ventriculostomy reservoir, comprising:

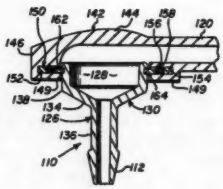
a base configured to provide an internal reservoir well, the base including an inlet and an upwardly extending wall portion formed as a unit with the inlet;

a cap positioned over the base to enclose the reservoir well, which cap, together with the base, defines an internal reservoir, the cap including a dome portion, an outlet and a downwardly extending cap ring which engages the base wall portion to hold the cap to the base; and

means for attaching the cap to the base to form a fluid-tight interference fit between the cap and the base, the attaching means including first means associated with the base for connecting the base to the cap, and second means associated with the cap ring for connecting the base to the cap, the first and second connecting means including a

detent provided in one of the first and second connecting means, and a protrusion provided on the other of the first





and second connecting means, wherein the protrusion and the detent interfit to securely hold the cap to the base.

4,995,857

LEFT VENTRICULAR ASSIST DEVICE AND METHOD FOR TEMPORARY AND PERMANENT PROCEDURES

John R. Arnold, 666 Seminole Dr., Winter Park, Fla. 32789

Filed Apr. 7, 1989, Ser. No. 334,934

Int. Cl.[5] A61F *1/24*

U.S. Cl. 600—16 **21 Claims**

1. A method for relieving the hemodynamic burden on a diseased left ventricle in the heart of a patient, comprising the steps of:

implanting a shunt within the patient's chest cavity between the interior of the patient's left atrium and the patient's major arterial system;

positioning an impeller in said shunt;

implanting a power source within the patient's chest cavity; and

actuating said impeller with the power source so as to effectuate a substantially non-turbulent, non-traumatic flow of blood from the left atrium directly into the patient's arterial system.

4,995,858

DEVICE FOR HALTING SHEET PRODUCTS

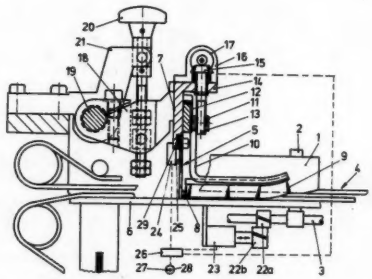
Rudolf Stöb, Frankenthal, Fed. Rep. of Germany, assignor to Albert-Frankenthal AG, Frankenthal, Fed. Rep. of Germany

Filed Jan. 24, 1990, Ser. No. 469,315

Claims priority, application Fed. Rep. of Germany, Feb. 4, 1989, 3903381

Int. Cl.[5] B65H *9/04*

U.S. Cl. 493—445 **9 Claims**



1. A device for halting sheet products conveyed by a conveyor belt defining a conveying plane, comprising an abutment ' ·ving said conveyor belt extending therethrough, an adjustable braking means arranged before said abutment in the direction of motion of said belt, said braking means being in the form of brush fitted with means for raising and lowering said brush in relation to said conveying plane, a table placed under said brush, a sensing means for sensing the force of the impact of such products on the abutment, and means for resetting the brush in accordance with an output signal of such sensing means.

4,995,859

SHEET MATERIAL STACKING APPARATUS

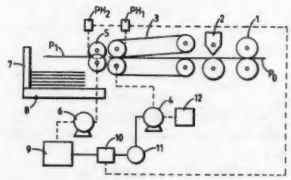
Mikio Totani, Kyoto, Japan, assignor to Totani Giken Kogyo Co., Ltd., Kyoto, Japan

Continuation of Ser. No. 185,553, Apr. 25, 1988, abandoned. This application Nov. 27, 1989, Ser. No. 443,078

Claims priority, application Japan, Apr. 17, 1986, 61-89354

Int. Cl.[5] B65H *29/68, 29/70*

U.S. Cl. 493—204 **6 Claims**



1. A sheet material stacking apparatus comprising: heat cut bar means for heating cutting a continuous plastic material, the plastic material being folded in two along its center line, intermittently fed to said heat cut bar means and heat cut by said

heat cut bar means to successively produce a number of plastic bags;

upper and lower stacker belt mean disposed downstream of said heat cut bar means and continuously driven, the upper stacker belt means is lowered toward the lower stacker belt means whenever the plastic material is heat cut by said heat cut bar means to clamp the plastic bag between the upper and lower stacker belt means so that the plastic bag is torn from said heat cut bar means by the stacker belt means;

upper and lower clamp rollers disposed downstream of and adjacent the stacker belt means to clamp the plastic bar delivered from said stacker belt means between the clamp rollers, the plastic bag being discharged from said clamp rollers so that its falls down for stacking the plastic bags;

a servo motor operatively connected to said clamp rollers to rotate the same;

a detector disposed upstream of said clamp rollers to detect the position of said plastic bag;

a control device connected to said motor and said detector so that after the plastic bag is completely delivered from said stacker belt means to said clamp rollers and immediately before the plastic bag is completely discharged from said clamp rollers, said control device controls said servo motor to momentarily decrease the number of revolution (R.P.M.) thereof in response to a detection signal from said detector; and

said clamp roller being spaced widthwise of the plastic bag and disposed in upper and lower rows in staggered relation for deforming the plastic bag into wave form between said claim rollers so as to shape the plastic bag into more rigid structure for ease of handling and stacking.

4,995,860

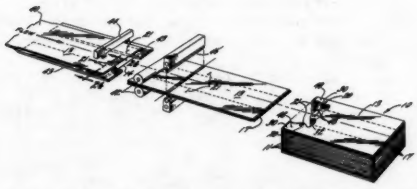
EASY OPENING BAG PACK AND SUPPORTING RACK SYSTEM AND FABRICATING METHOD

Harry B. Wilfong, Jr., Hartsville, S.C., assignor to Sonoco Products Company, Hartsville, S.C.

Division of Ser. No. 472,781, Jan. 31, 1990. This application Apr. 18, 1990, Ser. No. 510,730

Int. Cl.[5] B31B *23/86, 37/86*

U.S. Cl. 493—195 **4 Claims**



1. A method of fabricating easy opening bag packs in which each of the bags has integrally connected front and rear wall portions and gussetted side wall portions secured together at the bottoms thereof to define a closed bottom and at least partially open at the tops thereof to define a mouth portion and aligned bag mounting apertures cut through all of the wall portions on opposed sides of the bag near the top thereof and an additional cut portion in the front wall portion and the front section of the gussetted side wall portions and in communication with the apertures therein for effectively enlarging the apertures to provide easy opening of the bag when mounted on outwardly extending stub shaft supports of a rack, said method including the steps of:

feeding a generally flat side-gussetted continuous tube of material in a generally linear direction and along flat plates extending into the side gusset folds to separate front and rear sections of the gusset folds;

cutting the top layer and front section of the gusset fold against the flat plates on opposed sides of the continuous flat tube in a desired configuration at spaced intervals as the tube is being fed in the linear direction to form the additional cut portion for effectively enlarging the bag mounting apertures in the bags being fabricated;

thereafter transversely cutting the continuous flat tube at spaced intervals as the tube is being fed in the linear direction and between the cuts formed by the preceding cutting step to form individual bags from the tube and while sealing at least every other transverse cut to form the closed bottoms on the bags; and

cutting the bag mounting apertures through all of the layers on opposed sides of the bags and to communicate with the additional cut in the top layer and front section of the gusset folds at a desired time in the bag fabricating method.

4,995,861

MECHANICAL SHIFTABLE THREE SPEED PLANETARY TRANSMISSION

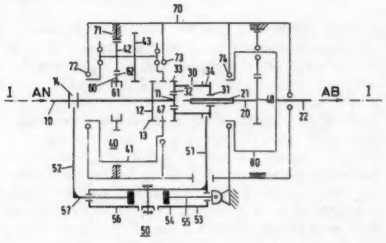
Peter Erlbruch, Herdecke, Fed. Rep. of Germany, assignor to Mannesman Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

Filed Dec. 21, 1989, Ser. No. 453,317

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1988, 3844166

Int. Cl.[5] F16H *1/46, 3/54*

U.S. Cl. 475—298 **10 Claims**



1. A mechanically shiftable three speed planetary gear transmission comprising:

a housing;

a driving shaft extending from the housing, said driving shaft having a head thereon within the housing;

said head of said driving shaft having a first portion and a second portion, said first portion being attached to said driving shaft and said second portion being axially spaced apart from said first portion;

a central toothed sun gear attached to said first portion of said head of said driving shaft;

a toothed clutch gear attached to said second portion of said head of said drive shaft;

an opposed axially spaced output shaft coaxial with said driving shaft, said output shaft having external gear teeth provided thereon within the housing;

a gear shift sleeve slideably mounted for axial movement along the output shaft;

said gear shift sleeve having a first set of gear teeth for engagement with the external gear teeth of the output shaft and a second set of gear teeth for engagement with said toothed clutch gear;

a shift device protruding from the housing, and locked to said driving shaft for axially moving said driving shaft, engaged with said gear shift sleeve for sliding the same;

a pinion cage containing variable planetary gears having different diameters;

an internal toothed ring gear in the housing with which one of said planetary gears mesh; and

an internally and externally toothed ring gear concentric

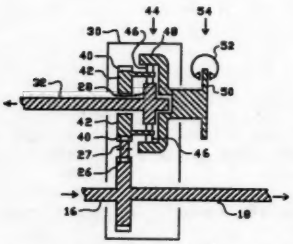
with said central sun gear and selectively engageable with said planetary gears and said central sun gear.

4,995,862

INTERAXLE TRANSFER MECHANISM FOR FOUR WHEEL DRIVE VEHICLES

Henry F. Arocha, 6603 Orion Ave., Van Nuys, Calif. 91406

Filed Aug. 21, 1989, Ser. No. 396,295
Int. Cl.[5] F16H *1/44.5, 1/42*
U.S. Cl. 475—86 9 Claims



1. An interaxle drive transfer mechanism, interposed in an auxiliary motive power path between an engine and an auxiliary driveshaft of a part time four wheel drive vehicle, comprising:

a primary differential gear set having a first gear element rotationally coupled to a power driveshaft receiving motive power from the engine, a second gear element rotationally coupled to the auxiliary driveshaft, and a third gear element;

a braking unit having a rotor rotationally coupled to the third gear element; and

controlling means adapted to select one from at least the following three levels of braking torque and corresponding vehicle drive modes: (1) full braking torque, locking the rotor so as to provide a four wheel front-rear-locked four wheel drive mode, (2) partial braking torque, allowing limited rotor slippage so as to provide a limited-slippage-auxiliary four wheel drive mode, and (3) zero braking torque, allowing free rotor rotation so as to prevent drive power from reaching the auxiliary driveshaft and to thus provide a two wheel drive mode.

4,995,863

CATHETER WITH SLIT VALVE

Colin J. Nichols, Fruit Heights; Gregory N. Nordgren, West Valley City, and Harvey R. Moorehead, Salt Lake City, all of Utah, assignors to Catheter Technology Corporation, Salt Lake City, Utah

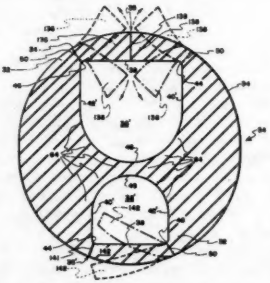
Continuation of Ser. No. 915,474, Oct. 6, 1986, Pat. No. 4,753,640. This application Feb. 25, 1988, Ser. No. 160,473
The portion of the term of this patent subsequent to Jun. 28, 2005, has been disclaimed.
Int. Cl.[5] A61M *5/00*
U.S. Cl. 604—247 56 Claims

1. An indwelling multi-lumen catheter comprising:

a catheter tube made of biocompatible material, the catheter tube comprising a distal end portion having a single smooth exterior surface and ending in a closed distal tip, a proximal end portion, and wall means defining a plurality of independently usable lumens extending substantially the entire length of the catheter tube;

a normally sealed, selectively operable, laterally disposed, three-position slit valve communicating between the distal end of one of the lumens and the exterior surface of the distal end portion, the slit valve affording selective influent and effluent flow control into and out of the lumen associated therewith;

the slit valve comprising a slit extending through the wall, the slit being essentially parallel to and offset from the axis of the catheter tube and being defined by opposed, aligned, normally sealed, parallel first and second edges of respective oppositely disposed first and second slit valve wall segments of the wall between the associated lumen and the exterior surface of the distal end portion, the first slit valve wall segment being pivotably displaceable inwardly and outwardly responsive to predetermined liquid pressure differentials between the pressure in the associated lumen and the pressure exterior to the catheter tube, thereby to pivot the first edge into a spaced-apart spatial



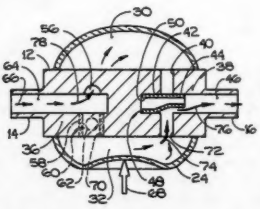
relationship from the second edge, whereby the first edge is capable of selectively opening either outwardly from the normally sealed position to infuse fluid from the one of the lumens into the space exterior to the distal end portion, or inwardly from the normally sealed position to withdraw fluid from the space exterior to the distal end portion into the one of the lumens, the first slit valve wall segment being eccentrically disposed in the slit valve with the slit being asymmetrically disposed between the two slit valve wall segments in offset relation to the center of the slit valve.

4,995,864

DUAL CHAMBER PUMPING APPARATUS

Victor L. Bartholomew, Escondido, and Giorgio di Palma, Ramona, both of Calif., assignors to Imed Corporation, San Diego, Calif.

Filed Aug. 15, 1989, Ser. No. 394,076
Int. Cl.[5] A61M *1/00*
U.S. Cl. 604—153 11 Claims



9. A dual chamber pumping apparatus for use in infusing fluids to a patient comprising:

a disk having a fluid inlet and a fluid outlet; and

a first resilient membrane attached to a first side of said disk for establishing a first pumping chamber, and a second resilient membrane attached to a second side of said disk for establishing a second pumping chamber;

said disk having inlet valve means for connecting said fluid inlet in fluid communication with said first pumping chamber and said second pumping chamber, said valve

means including a first one-way valve movable between an open position for allowing fluid to flow from said fluid inlet into said first pumping chamber and a closed position for preventing fluid from flowing from said first pumping chamber back into said fluid inlet, said valve means further including a second one-way valve movable between an open position for allowing fluid to flow from said fluid inlet into said second pumping chamber and a closed position for preventing fluid from flowing from said first pumping chamber back into said fluid inlet;

said disk further having outlet valve means connecting said first and second pumping chambers in fluid communication with said fluid outlet, said outlet valve means including a one-way outlet valve for preventing fluid flow from said fluid outlet back into said first and second pumping chambers, and being movable between a first position for allowing fluid to flow from said first pumping chamber into said fluid outlet while preventing fluid from flowing from said second pumping chamber into said fluid outlet, and a second position for allowing fluid to flow from said second pumping chamber into said fluid outlet while preventing fluid from flowing from said first pumping chamber into said fluid outlet.

4,995,865

MULTI-LUMEN CATHETERS

William J. Gahara, Nashua, and Thomas R. Johnson, Milford, both of N.H., assignors to Worldwide Medical Plastics Inc., Nashua, N.H.

Filed Jun. 9, 1989, Ser. No. 364,799
Int. Cl.[5] A61M *5/00*
U.S. Cl. 604—43 **15 Claims**

1. A three-lumen catheter comprising:

an elongated unitary tube having an integral septum extending within the entire length of said tube and dividing the interior of said tube into first, second and third lumens, said integral septum having an approximately T-shaped cross-section;

the outer circumference of said tube converging smoothly at its distal end to form a conical tapered tip;

said first lumen extending from the proximal end of said tube continuously through said conical tapered tip to an opening at the apex of said tip, said first lumen for introducing fluid to a body cavity;

each of said second and third lumens extending continuously from the proximal end of said tube to at least one opening in the sidewall thereof at a location axially spaced from said conical tip, both said second and third lumens for withdrawing fluid from a body cavity; and

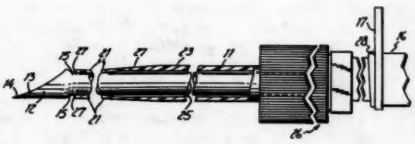
each of said second and third lumens having no opening through the apex of said conical tip.

4,995,866

COMBINED NEEDLE AND DILATOR APPARATUS

Kurt Amplatz, St. Paul, and Frank Kotula, Maple Grove, both of Minn., assignors to Microvena Corporation, Vadnais Heights, Minn.

Filed Dec. 15, 1989, Ser. No. 451,093
Int. Cl.[5] A61M *5/00*
U.S. Cl. 604—53 **9 Claims**



1. A combined needle and dilator apparatus, comprising:

a. A needle with an elongated shaft terminating forwardly in a head having an outer diameter greater than the outer diameter of the shaft adjacent the head and defining a generally rearwardly facing shoulder, the head terminating forwardly in a cutting edge; and

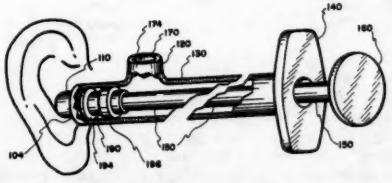
b. A dilating sheath slidably carried about the needle shaft and having a generally cylindrical front portion terminating in a forward rim abutting the shoulder of the needle head, said front portion having a uniform outer diameter substantially equal to the outer diameter of the needle head to define, with the head, a generally smooth surface; the sheath further having a generally cylindrical body portion with an outer diameter greater than the outer diameter of said front portion, and a tapered portion having rearwardly divergent walls and disposed between said front portion and said body portion of the sheath, the tapered portion having an outer surface smoothly merging into the outer surfaces of the front portion and the body portion.

4,995,867

AURAL MEDICATION DISPENSER

Eugene A. Zollinger, 3075 S. State Highway 91, Wellsville, Utah 84339

Filed Jan. 24, 1990, Ser. No. 470,193
Int. Cl.[5] A61M *35/00*
U.S. Cl. 604—54 **6 Claims**



1. A method for repeatably delivering medication using a single aural medication dispensing device without contaminating source medical fluid comprising the following steps:

(a) provide an aural medical dispensing device comprising:

plunger means for moving and sealing fluid within a syringe barrel means, the plunger means comprising:

rod means of sufficient length to drive substantially all fluid residing within the syringe barrel means through a distal port means of the syringe barrel means;

seal means on the distal end of the plunger means comprising:

seal end means on the distal end of the seal means which can seal and wipe the inner surface of the

syringe barrel means as it is moved distally to drive fluid toward the distal port means of the syringe barrel means;

seal length means, contiguous with and extending proximal from the seal end means, which provide lateral stability to the seal means and rod means to provide seal integrity as the seal means is moved past an open side port means of the syringe barrel means;

syringe barrel means comprising:

proximal entry port means for the plunger means;

distal effluent port means from which fluid can be dispensed into an external auditory canal; and

side port means into which medical fluid can be introduced without the inserted fluid being contaminated by material on the distal effluent port means and which is positioned sufficiently proximal from the distal effluent port means that a unit dose can be stored and sealed by the plunger seal means without leakage from the distal effluent port means;

(b) pull the plunger means proximally from the distal end of the syringe barrel means until the seal means is clear of the entry space of the side port means of the syringe barrel means;

(c) holding the syringe barrel such that the side port means opens vertically upward and using an eye dropper or the like transfer medication through the side port means into the syringe barrel means;

(d) after a unit dose is contained in the syringe barrel means, move the plunger means distally until the seal means seals the medication from the entry side port means;

(e) place the distal effluent port means at the entry orifice of the external auditory canal and push the plunger means to the distal end of the syringe barrel means discharging the medication dose into the ear;

(f) return to step (b) to repeat as necessary.

4,995,868

CATHETER

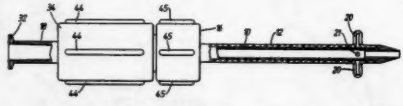
Gary B. Brazier, Great Oakley, United Kingdom, assignor to Bard Limited, Crawley, United Kingdom

Filed Sep. 26, 1989, Ser. No. 412,993

Claims priority, application United Kingdom, Oct. 12, 1988, 8823905; Nov. 28, 1988, 8827751

Int. Cl.[5] A61M *29/00*

U.S. Cl. 604—105 **18 Claims**



1. A catheter comprising an inner tube having a distal end for insertion into a human or animal body, said inner tube having an opening defined therein at or near the distal end thereof to establish a fluid path, and a proximal end to be located outside the body, a hollow connector secured to the proximal end of the inner tube for attachment to a fluid supply or fluid drain; an outer tube concentric with the inner tube and having a distal end secured to the distal end of the inner tube, a proximal end to be located outside the body and an expandable and contractible retention structure adjacent to the distal end; actuating means on the proximal ends of said inner and outer tubes for the expandable retention structure including means for enabling and effecting relative sliding movement of the proximal ends of the tubes and thereby to expand or contract the retention structure and respectively define an expanded condition or a contracted condition, wherein a housing is secured to the proximal end of the outer tube and is so dimensioned that when the retention structure is in a contracted condition, the inner tube connector is located within the housing and when the retention structure is in an expanded condition, the inner tube connector protrudes beyond the housing.

4,995,869

MONO-USE SYRINGE FOR HYPODERMIC INJECTIONS

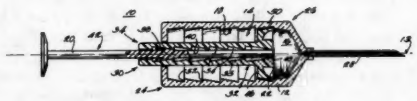
Martin McCarthy, Milan, Italy, assignor to Clyde Fessler, Milwaukee, Wis.

Filed Oct. 10, 1989, Ser. No. 419,022

Claims priority, application Italy, Dec. 21, 1988, 23040 A/88

Int. Cl.[5] A61M *5/00*

U.S. Cl. 604—110 **10 Claims**



1. A syringe for hypodermic injections having a needle, the syringe comprising

a barrel defining a chamber in fluid communication with the needle,

a guide member disposed within the chamber,

a plunger disposed within the chamber and between the guide member and the needle, the plunger having a stem extending through the guide member,

first ratchet means on the guide member and one the barrel for allowing movement of the guide member and plunger to a remote position relative to the needle and for preventing return movement of the guide member, and

second ratchet means on the guide member and the stem for allowing movement of the plunger relative to the guide member in the direction of the needle and for preventing movement of the plunger relative to the guide member in the direction away from the needle.

4,995,870

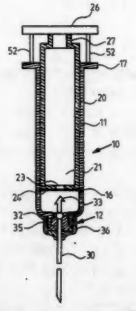
DISPOSABLE SYRINGE WITH RETRACTABLE NEEDLE

Morris J. Baskas, 200 California Rd. #14, Bronxville, N.Y. 10708

Filed May 9, 1990, Ser. No. 520,733

Int. Cl.[5] A61M *5/00*

U.S. Cl. 604—110 **13 Claims**



1. A safety syringe for administering medicaments, comprising a barrel having an outlet end, a needle removably supported at the outlet end and having a first portion extending into the barrel and a second portion extending externally, a plunger slidably disposed within the syringe, and means on the first needle portion upon contact with the plunger for connect-

ing to the plunger whereby upon retraction of the plunger the needle after use can be safely retracted and stored for disposable inside the syringe, said safety syringe further comprising a resilient plug mounted at the outlet end and surrounding the needle, and means for compressing the plug to lock the needle to the outlet end.

4,995,871

NEEDLE DETACHER FOR SYRINGE

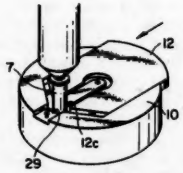
Hirotaka Sasaki, Sayama; Aguri Tanaka, Tokyo; Hiroyuki Inagaki, Kamakura; Tatsuo Suzuki, Tokyo, and Kenji Asakura, Funabashi, all of Japan, assignors to Snow Brand Milk Products Co., Ltd., Hikkaido, Japan

Filed Jan. 30, 1989, Ser. No. 303,228

Claims priority, application Japan, Feb. 4, 1988, 63-14177[U]; Nov. 16, 1988, 63-149247[U]

Int. Cl.[5] A61M *5/00*; B65D *83/10*

U.S. Cl. 604—110 14 Claims



1. A needle detacher for detaching a needle from a syringe cylinder comprising:

(1) a relatively rigid and elongated container body having an end thereof closed and being configured such that the container body may be firmly grasped by a hand of a user and without substantial deformation of the container body;

(2) a lid assembly, connected to an other end of said container body, having a stationary outer lid and a movable inner lid which is slidable in relation to the outer lid;

(3) spring means associated with said inner lid so as to bias the inner lid such that inner lid portions and outer lid portions are spaced apart and define therebetween an adjustable needle trap opening, and wherein said inner lid is manually movable relative to said outer lid that:

(i) the trap opening may be decreased sufficiently by manual force on the inner lid against said spring means so as to forcibly engage a needle neck of a needle disposed in the trap opening between the said lid portions that a syringe cylinder attached to the needle and the lid assembly may be rotated relative to each other sufficiently to detach the needle from the syringe cylinder; and

(ii) the trap opening may be increased sufficiently by release of said manual force on said inner lid and by action of said spring so as to release the needle neck from between the said lid portions and allow the needle to fall through said needle chute opening into the container body; and

(4) closing means associated with the inner lid such that said trap opening is at least substantially closable after said needle has been received in the container body.

4,995,872

EXPANDABLE CATHETER AND BRIDGE DEVICE

Janice J. Ferrara, 11605 Timberly Waye, Richmond, Va. 23233

Filed Oct. 4, 1989, Ser. No. 416,983

Int. Cl.[5] A61M *25/00*

U.S. Cl. 604—280 37 Claims

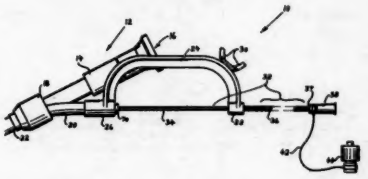
1. An expandable catheter and bridge device for use in combination with endoscopic instruments in catheterization procedures, comprising:

catheter means including

a catheter tube for catheterization use, said catheter tube having a proximal and a distal end,

a longitudinally inextensible section proximate said proximal end,

a longitudinally expandable section proximate said distal end, said inextensible and expandable sections forming a continuous catheter conduit between said proximal and distal ends, said continuous catheter conduit being laterally flexible; and



bridge means of substantially rigid structure for supporting and guiding said catheter tube, and for expanding said longitudinally expandable section, said bridge means including

a bowed section having a proximal catheter-encircling end at one end thereof and a distal catheter-encircling end at another end thereof for guiding said catheter means therethrough, said bowed section having a generally bow-like shape to facilitate manipulation of said catheter tube while said catheter tube is disposed between said proximal catheter-encircling end and said distal catheter-encircling end.

4,995,873

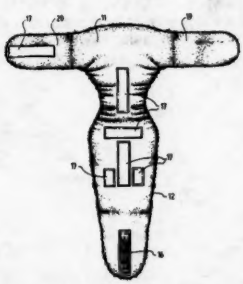
ABSORBENT GARMENT

Jackilyn M. Knight, 30 Tombonda Road, Murwillumbah, New South Wales, Australia (2484)

Filed Jun. 9, 1989, Ser. No. 364,764

Int. Cl.[5] A61F *13/15*

U.S. Cl. 604—391 7 Claims

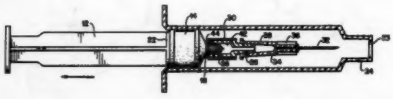


1. An absorbent garment having a cross-piece and an intersecting piece which together form a substantially "T-shaped" configuration when the garment is laid out flat, said cross-piece being a relatively narrow band having opposite ends for encircling the lower trunk of a wearer in an overlapping manner and said intersecting piece being a relatively wider and longer band defining a mid-sectional region and an end region; and

said garment including releasable fastening means fitted to said end region, said mid-sectional region and said opposite ends of said intersecting piece and said cross-piece, respectively; whereby, the end region of the intersecting piece passes under the crotch of the wearer and upwardly and then looped over said cross-piece in front of the

wearer and fastened to the mid-sectional region to produce a loincloth arrangement.

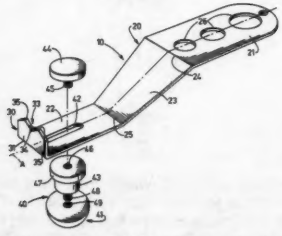
4,995,874
DISPOSABLE SYRINGE DEVICE
H. Allen Strickland, 83 Beach St., Westerly, R.I. 02891
Filed Jun. 23, 1989, Ser. No. 370,718
Int. Cl.[5] A61M *5/32*
U.S. Cl. 604—195 6 Claims



1. A disposable syringe device having a retractable needle, comprising:

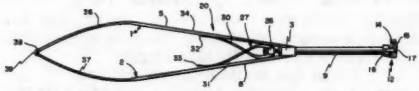
a cylinder member having a neck portion at one end thereof; a plunger mounted for reciprocal movement within said cylinder, said plunger having a threaded portion at one end; a threadbore member mounted within said neck portion in fluid tight engagement therewith, said threadbore member having an inner bore with a threaded portion in said bore for receiving the threaded portion of said plunger; a tapered post member mounted on one end of said threadbore member outwardly of said cylinder, said post member having said needle mounted therein; and a gasket mounted about the circumference of said threadbore member to provide fluid tight engagement between the threadbore member and the neck portion of said cylinder.

4,995,875
FEMORAL ELEVATING TOOL
Cecil Coes, 6830 Elwynn Dr., Cincinnati, Ohio 45236
Filed May 27, 1988, Ser. No. 199,475
Int. Cl.[5] A61F *2/00*
U.S. Cl. 606—90 19 Claims



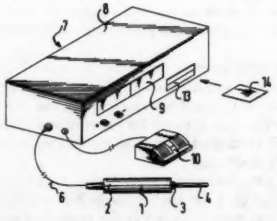
1. A femoral elevating tool for use in hip replacement surgical procedures, said tool comprising a handle having proximal and distal ends and a longitudinal axis along its length, said handle including a bone rest adjacent its distal end and being substantially planar to its perpendicular axis, and a ball means attached to said handle intermediate said proximal and distal ends and extending outwardly from said longitudinal axis for anchoring said tool in an acetabulum to provide a fulcrum for said tool.

4,995,876
NEUROSURGICAL CLIP APPLIER
Ana E. Puig, 308 Hawkeye Court, Iowa City, Iowa 52240
Continuation-in-part of Ser. No. 716,496, Mar. 27, 1985, abandoned. This application Feb. 6, 1986, Ser. No. 826,911
Int. Cl.[5] A61B *17/00*
U.S. Cl. 606—142 6 Claims



1. A surgical instrument for applying surgical ligating clips onto a blood vessel or tissue in connection with a surgical operation, said instrument comprising a pair of opposed jaws integrally joined to each other but capable of pivoting movement toward and away from each other by elastic bending of the material from which they are formed, a pair of opposed handles integrally joined to each other but capable of pivoting movement toward and away from each other by elastic bending of the material from which they are formed, and actuating member comprising a pair of leg members joined together by a bight portion, the free ends of each of said leg members being rigidly secured to a respective one of said opposed handles, a push rod connecting said bight portion to one of said pair of opposed jaws, said leg members and said bight portion being integrally joined to each other so that no relative motion between the bight portion and either of said leg members is possible at the point of juncture between them whereby pivoting movement of said handles is converted into linear reciprocating movement of said bight portion and of said push rod thereby causing pivoting motion of said one of said pair of opposed jaws.

4,995,877
DEVICE WITH A ROTATIONALLY-DRIVEN SURGICAL INSTRUMENT
Felix Ams, Kämpfelbach; Manfred Baier, Bretten, and Roland Schäfer, Bretten-Diedelsheim, all of Fed. Rep. of Germany, assignors to Richard Wolf GmbH, Fed. Rep. of Germany
Filed Feb. 17, 1989, Ser. No. 311,758
Claims priority, application Fed. Rep. of Germany, Feb. 19, 1988, 3805179
Int. Cl.[5] A61B *17/32*
U.S. Cl. 606—180 8 Claims



1. A device comprising:

a rotationally driven surgical instrument having a hand-held element;

interchangeable cutting and milling inserts;

a mount rotatably installed in said hand-held element for reception of said interchangeable cutting and milling inserts;

a driving motor for driving the mount receiving the cutting and milling inserts, and;

a control unit for controlling the driving motor including

means for setting a rotational speed of the motor and for preselecting a rotational speed range and also an indicator for display of the rotational speed set in each case; said control unit comprising a non-volatile write-read memory for digital storage of user-specific rotational speed data,

a code carrier remote from said cutting and milling inserts and removable from said control unit, said code carrier carrying a reprogrammable encoding corresponding to speed data in said write-read memory, said encoding on said code carrier being reprogrammable by a user to set said surgical instrument to a user selected rotational speed range, and also

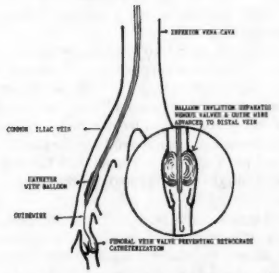
a means for coding/decoding said encoding on said code carrier, said means for coding/decoding selectively receiving said code carrier for reading said encoding.

4,995,878

METHOD FOR DESCENDING VENOGRAPHY

Dinker B. Rai, 230-20 53rd Ave., Bayside, N.Y. 11364

Filed Jul. 15, 1988, Ser. No. 219,140
Int. Cl.[5] A61M *25/01*
U.S. Cl. 606—194 **9 Claims**



1. A method for the evaluation of all types of chronic venous insufficiency of the lower extremities of the human body comprising the steps of:

introducing an angiocatheter into a superficial vein in the forearm of the body;

inserting a guide wire having a "J"-shaped tip into said angiocatheter and advancing said guide wire within the superficial vein of the forearm;

removing said angiocatheter from the superficial vein in the forearm while leaving the guide wire in place in the vein;

dilating the opening of the superficial vein around said guide wire;

introducing an elongated catheter having a diameter sufficiently small to pass unobstructed through the superficial vein of the forearm, and having a length sufficient to reach the distal thigh;

allowing the guide wire to be introduced from the superficial vein through the heart into the inferior vena cava and into the femoral vein in the groin;

simultaneously advancing said elongated catheter on said guide wire into said femoral vein in the groin of the body to examine the proximal valves of the femoral vein;

injecting an X-ray contrast fluid into said elongated catheter; and

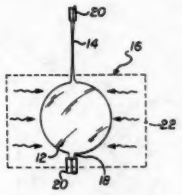
examining and evaluating competency of said valves in the femoral vein under fluoroscopy.

4,995,879

INTRAOCULAR LENS WITH UNITARY DRAWN HAPTICS

Robert R. Dougherty, 830 Greenridge Dr., La Canada, Calif. 91011

Filed Oct. 10, 1989, Ser. No. 419,127
Int. Cl.[5] A61F *2/16*
U.S. Cl. 623—6 **11 Claims**



6. A method of forming an intraocular lens, comprising the steps of:

forming a lens preform from a polymeric material to include a lens body adapted for shaping with selected optical characteristics and at least one lobe formed integrally with the lens body and protruding outwardly therefrom; and

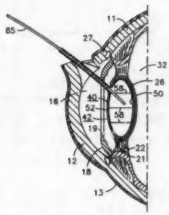
drawing at least a portion of the lobe into the shape of a support haptic.

4,995,880

INTRAOCULAR LENS AND METHOD OF SURGICALLY IMPLANTING SAME IN AN EYE

Samuel H. Galib, 104 Morlyn Rd., Bryn Mawr, Pa. 19010

Filed Sep. 26, 1989, Ser. No. 412,487
Int. Cl.[5] A61F *2/16*
U.S. Cl. 623—6 **27 Claims**



26. An intraocular lens implant for insertion into the surgically-prepare lens capsule of a human eye after the crystalline portion of the natural lens has been removed from said capsule through a small incision in ocular tissue at the front of the eye, said lens implant comprising:

(a) a collapsible and expansible bag that comprises a transparent body portion containing a cavity and an entrance opening to said cavity through which filler material can be introduced into said body portion, and

(b) said body portion being adapted to fit within the surgically-prepared lens capsule of said eye in a position adjacent the posterior wall of the lens capsule when expanded by filler material introduced thereinto via said small incision and said entrance opening, and in which said body portion further includes: (i) a flexible posterior face for juxtaposition with the posterior wall of said lens capsule, (ii) a flexible anterior face, and (iii) strands extending between said posterior and anterior faces for limiting the spacing between said faces when the body portion is expanded by filler material introduced therein.

4,995,881

HEART VALVE PROSTHESIS

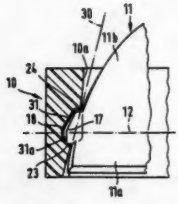
Martin Knoch; Helmut Reul, and Günter Rau, all of Aachen, Fed. Rep. of Germany, assignors to B. Braun Melsungen AG, Melsungen, Fed. Rep. of Germany

Filed Jul. 31, 1989, Ser. No. 387,701

Claims priority, application Fed. Rep. of Germany, Aug. 25, 1988, 3828830

Int. Cl.[5] A61F 2/24

U.S. Cl. 623—2 18 Claims



10. A heart valve prosthesis comprising:

a valve ring having a continuously narrowing inner surface, the inner surface having a plurality of recesses,

a closing member having a swivel axis and being provided with a plurality of journal pins, at least one of the plurality of journal pins being configured to engage at least one of the plurality of recesses,

at least one of the plurality of recesses being sectorshaped and having a rounded inner portion and an outer portion,

at least one of the journal pins defining a substantially oblong cross-section and having a first supporting surface configured to engage the rounded inner portion of the recess and a second supporting surface configured to engage the outer portion of the recess,

the first supporting surface defining an axis of curvature,

the swivel axis and the axis of curvature of the first supporting surface being substantially coincident.

4,995,882

RADIOLUCENT BREAST IMPLANT

Judy M. Destouet, St. Louis; John O. Eichling, Marthasville; Louis A. Gilula, St. Louis; Barbara S. Monsees, St. Louis, and Vernon L. Young, St. Louis, all of Mo., assignors to Washington University

Filed Aug. 28, 1989, Ser. No. 399,180

Int. Cl.[5] A61F 2/12

U.S. Cl. 623—8 14 Claims

1. A breast implant having an average radiographic density substantially the same as that of a human breast and being substantially radiolucent throughout its entirety.

4,995,883

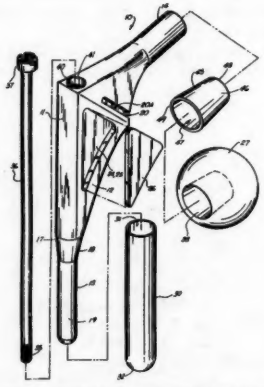
MODULAR HIP PROSTHESIS

Michael Demane; Thomas W. Fallin; Steve Garner, all of Memphis, and Jeff Schryver, Cordova, all of Tenn., assignors to Smith & Nephew Richards Inc., Memphis, Tenn.

Filed Feb. 8, 1989, Ser. No. 308,205

Int. Cl.[5] A61F 2/34, 2/30

U.S. Cl. 623—23 15 Claims



1. An implantable modular hip prosthesis that can be custom fitted to a particular patient by a surgeon prior to surgical insertion, comprising:

(a) a hip prosthesis main body having an upper proximal end portion and a lower stem portion, said proximal upper end portion including a neck portion extending from the main border and adapted to be coupled to a rounded joint head portion that is configured to engage the acetabulum;

(b) the lower stem portion extending distally from the main body and terminating at a rounded tip and having an internal through bore formed therein along the length thereof;

(c) an elongated tubular sleeve terminating at opposite ends and at least a portion of the sleeve being hollowed and opening at one end thereof wherein the hollowed portion is configured in shape for receipt of the stem lower end portion receptive of the stem;

(d) an elongated connecting rod having attachment means at one end thereof for operatively coupling the sleeve to the main body wherein the tubular sleeve is disposed over the lower stem portion and the connecting rod is inserted into the through bore and the attachment means is coupled to the tubular sleeve thereby forming a modular prosthesis that can be custom fitted to a particular patient prior to surgical insertion by interchanging sizes of the various components.

4,995,884

POLYALPHAOLEFIN EMULSIONS FOR FIBER AND TEXTILE APPLICATIONS

Stanley E. Ross, Greer, and AlexSandra C. Nasser, Mauldin, both of S.C., assignors to Henkel Corporation, Ambler, Pa.

Filed Dec. 8, 1989, Ser. No. 447,743

Int. Cl.[5] D06M *11/00, 13/00, 13/241, 23/00*

U.S. Cl. 8—115.6 19 Claims

1. A finish composition for fiber and textile materials comprising from about 5 to about 20 weight percent of antistatic agent, from about 25 to about 50 weight percent of an emulsifier, and the balance, a synthetic hydrocarbon oil comprising of an aliphatic polyalphaolefin obtained from the oligomerization of decene—1, based on the weight of said composition.

4,995,885

CONCENTRATED AQUEOUS DYE SOLUTIONS FOR DYEING PAPER

Hans Morawietz, Seewen, Switzerland, assignor to Ciba-Geigy Corp., Ardsley, N.Y.

Filed Nov. 13, 1989, Ser. No. 434,157

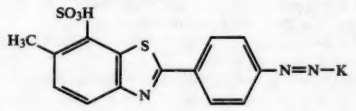
Claims priority, application Switzerland, Nov. 15, 1988, 4223/88

Int. Cl.[5] C09B *29/01, 67/26, 69/04*

U.S. Cl. 8—527 15 Claims

1. A concentrated aqueous dye solution containing

(a) 7 to 30% by weight of a dye of the formula



(1)

where K is a coupling component of the acetoacetanilide, pyridone, pyrazolone or pyrimidine series,

(b) 1 to 5 moles of 3-diethylamino-1-propylamine, 2-diethylaminoethanol or 2-(2-aminoethoxy)ethanol per mole of dye of the formula (1) and

(c) further, optional additives.

4,995,886

METHOD OF ASSEMBLING A CONTROLLED SEAL FOR AN EXPULSION FUSE

Frank L. Cameron, and George A. Smith, both of N. Huntingdon, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 445,057, Dec. 4, 1989, Pat. No. 4,952,900. This application Jun. 20, 1990, Ser. No. 540,986

Int. Cl.[5] H01H *69/02*

U.S. Cl. 29—623 2 Claims

1. A method of assembling a sealing construction for an electric circuit interrupter, and having a controlled mechanical strength, the steps comprising:

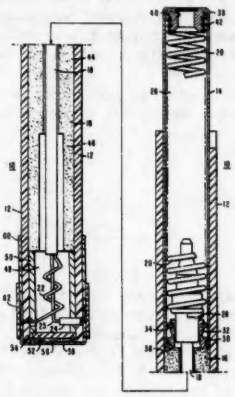
providing a tubular insulating casing with an inner wall, an expulsion end, a fuse end, and a sleeve in said fuse end,

inserting a diaphragm in said expulsion end against said sleeve,

applying a layer of cement around the periphery of said diaphragm between said diaphragm and said inner wall of said tubular insulating casing to affix said diaphragm and to seal said expulsion end,

providing an end cap to enclose said expulsion end, and

prior to placing said end cap onto said expulsion end, applying epoxy cement into said cap in order for said cement to fill the space existing at said expulsion end between said



diaphragm and said end cap and any voids existing between said end cap and said tubular insulating casing.

4,995,887

CUTTING ELEMENTS FOR ROTARY DRILL BITS

John D. Barr, Cheltenham, England, and Thomas A. Newton, Jr., Houston, Tex., assignors to Reed Tool Company Limited, Gloucestershire, England

Filed Apr. 4, 1989, Ser. No. 333,297

Claims priority, application United Kingdom, Apr. 5, 1988, 8807875; Nov. 15, 1988, 8826672

Int. Cl.[5] B24B *1/00*

U.S. Cl. 51—295 38 Claims

1. A cutting element for a rotary drill bit comprising a layer of polycrystalline diamond material having a front face and a rear face, a backing layer of less hard material bonded to the rear face of the diamond layer, and a front layer of less hard material bonded to the front face of the diamond layer and extending across at least the major part thereof, the front layer being thinner than the backing layer, at least in the vicinity of the cutting edge, and the backing layer, diamond layer and front layer constituting a preformed structure in which the layers have been bonded together in a high temperature, high pressure press.

4,995,888

SEPARATION OF GAS FROM SOLVENT BY MEMBRANE TECHNOLOGY

Richard F. Beaupre, Darien, Conn., and Dick Y. Jung, Fishkill, N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed Jul. 5, 1988, Ser. No. 214,983

Int. Cl.[5] B01D *53/22, 71/16*

U.S. Cl. 55—16 10 Claims

1. The method of separating a charge rich liquid containing gas dissolved in solvent therefor which comprises

maintaining said charge rich liquid containing gas dissolved in solvent therefore in liquid phase in contact with a gas-permeable, essentially solvent impermeable membrane of pore size of less than about 1000 A and molecular weight cutoff of below about 1,000 selected from the group consisting of cellulose acetate membrane, hydrolyzed cellulose membrane, and polyethyleneimine membrane, and;

maintaining a pressure drop across said gas-permeable essentially solvent-impermeable membrane;

passing said gas from the charge rich liquid containing gas dissolved in solvent therefore at the higher pressure side of said membrane through said membrane thereby form-

ing lean liquid containing decreased quantities of gas dissolved in solvent on the higher pressure side of said membrane and, on the lower pressure side of said membrane, gas containing decreased quantities of liquid;

recovering lean liquid containing decreased quantities of gas dissolved in solvent from the high pressure side of said membrane; and

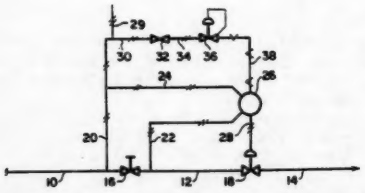
recovering gas containing decreased quantities of liquid from the lower pressure side of said membrane.

4,995,889

CONTROL OF PRODUCT WITHDRAWAL FROM A SORPTIVE SEPARATION SYSTEM

Alan D. Abel, Allentown; William E. Waldron, North Catasauqua, and Theodore F. Wells, Allentown, all of Pa., assignors to Air Products and Chemials, Inc., Allentown, Pa.

Filed Feb. 23, 1990, Ser. No. 484,590
Int. Cl.[5] B01D 53/04
U.S. Cl. 55—21 18 Claims



1. A method for maintaining relatively constant flow of product gas from a sorptive gas separation apparatus wherein the product gas withdrawal rate periodically varies on demand over multiple cycles from approximately its design rate to an increased rate above approximately said design rate, comprising:

(a) continuously measuring the pressure drop across a variable or fixed orifice device by sensing the pressure upstream and downstream of said device;

(b) providing a pneumatic signal, which is proportional to the difference between a set desired pressure drop and the measured pressure drop of step (a), to a pneumatically opened control valve in a product gas flow line; and

(c) adjusting the flow of product gas in said product gas flow line by opening or closing said control valve proportional to said pneumatic signal.

9. A flow control means for the product line of a sorptive gas separation apparatus, comprising:

(a) a pneumatically opened control valve connected to the product line of the separation apparatus to control flow of product therethrough,

(b) a variable or fixed orifice device connected to the product line upstream of said control valve;

(c) a differential pressure controller having means to sense pressure upstream and downstream of said orifice device and means to deliver a pneumatic signal to said control valve proportional to the difference between a set desired differential pressure and the differential of the sensed pressures from upstream and downstream of said orifice device; and

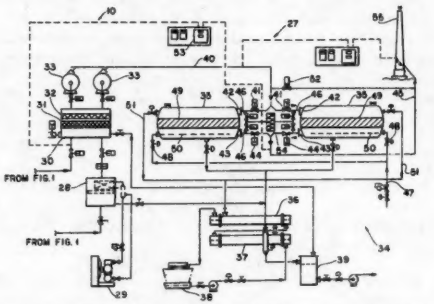
(d) means for providing pneumatic instrument gas at elevated pressure to said controller substantially only during such times as product gas is produced from said sorptive gas separation apparatus.

4,995,890

STORAGE TERMINAL VAPOR EMISSION CONTROL SYSTEM

Gordon R. Croudace, Pennant Hills, Australia, assignor to Croudace Holdings Pty Ltd., New South Wales, Australia

Filed Jan. 25, 1989, Ser. No. 302,768
Claims priority, application Australia, Jan. 27, 1988, PI6432
Int. Cl.[5] B01D 53/04
U.S. Cl. 55—180 5 Claims



1. A combination bulk liquid chemical tank storage complex and vapour emission control system comprising:

a plurality of vapour collection ducts;

at least one tank connected to one of said vapour collection ducts;

a flow diverter in said one of said vapour ducts to allow air to enter the duct but prevent vapour reflux;

a header duct communicating with said collection ducts to receive vapour therefrom;

fan means communicating with each collection duct to draw vapour into the collection duct from a vapour source, for delivery into said header duct;

an air plenum connected to said header duct to receive the vapour therefrom, said plenum including heating and cooling coils to heat and cool the vapour passing through said plenum, said plenum having a plenum outlet duct;

low explosion level monitoring means to sense vapour concentration at several locations within the complex;

air delivery means to deliver air into said complex to selectively lower the vapour concentration within the complex in response to said low explosion level monitoring means detecting a high vapour concentration;

a vapour emission control system to receive vapour from said complex, said system including collection duct means to collect vapour from said plenum outlet duct, and an activated carbon adsorption plant communicating with said duct means to receive the vapours therefrom, said plant including:

a pair of adsorber vessels each having an inlet and an outlet and an activated carbon bed positioned between the inlet and outlet so that vapours passing through each adsorber vessel pass through the activated carbon bed thereof;

a common delivery duct to deliver vapours to each adsorber vessel, a first branch duct extending from said common delivery duct to a first one of said vessels, a second branch duct extending from said common delivery duct to the other vessel, a first valve means to selectively close said first and second branch ducts;

an outlet duct means extending from said vessels, a first outlet branch duct extending from the outlet of said one vessel to said outlet duct means, a second outlet branch duct extending from the outlet of said other vessel to said outlet duct means, second valve means to selectively close each of said outlet branch ducts;

desorption piping to deliver to each vessel steam to be passed through each carbon bed to regenerate the car-

bon bed and convey released vapours and steam from the vessels; wherein said complex further includes:

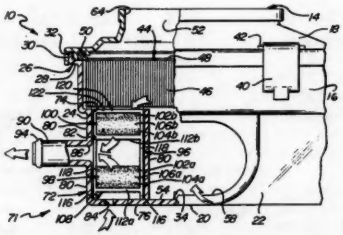
a first transfer duct means connecting the outlet of the first said vessel to the inlet of the second said vessel, a second transfer duct means connecting the outlet of the second said vessel to the inlet of the first said vessel, a third valve means to selectively close said first and second transfer duct means; and wherein said first and second valve means are operable to connect said vessels in series or parallel.

4,995,891

SECONDARY AIR FILTER ASSEMBLY

Alan Jaynes, Ortonville, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Mar. 5, 1990, Ser. No. 488,204
Int. Cl.[5] B01D *51/00*
U.S. Cl. 55—419 **17 Claims**



17. A filter cartridge assembly used for filtering air of a crankcase ventilating system of an internal combustion engine, said assembly comprising:

first (**108**) and second (**110**) air permeable filter platforms supporting first (**98**) and second (**100**) filters respectively, each of said first (**108**) and said second (**110**) filter platforms including four interconnected peripheral members (**112**) forming identical square-shaped peripheries having four equal sides and four corners, each of said first (**108**) and said second (**110**) filter platforms including intersecting cross members (**114**) extending diagonally across each of said peripheries between said corners, said first (**108**) and said second (**110**) filter platforms being disposed in parallel planes spaced a predetermined distance from one another to establish a filter spacing between said first (**98**) and said second (**100**) filters;

vertical support columns (**118**) interconnecting said corners of said first (**108**) and said second (**110**) filter platforms;

leg members (**116**) formed as a continuation of said vertical support members (**118**) extending from each of said corners of said first (**108**) filter platform a predetermined extended distance in a direction opposite said first filter (**98**);

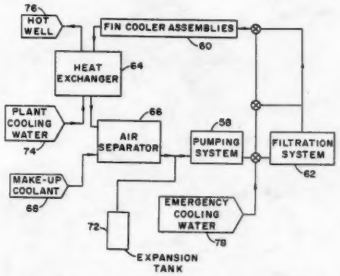
a filter retainer (**120**) including four peripheral members (**122**) equal in length forming a square-shaped periphery having four equal sides and four corners identical in shape to said peripheries of said first (**108**) and said second (**110**) filter platforms, said filter retainer (**120**) being disposed in a horizontal plane above said second filter (**100**) opposite and spaced from said second filter platform (**110**), said vertical support columns (**118**) interconnecting said corners of said filter retainer (**120**) and said second filter platform (**110**), said spacing between said filter retainer (**120**) and said second filter platform (**110**) being greater than said extended distance of said leg members (**116**) and less than said spacing between said first (**108**) and said second (**110**) filter platforms.

4,995,892

PROCESS AND APPARATUS FOR CONTROLLING THE THERMAL ENVIRONMENT OF GLASS FIBER FORMING

Jeffrey L. Garrett, Lexington; Harry Makitka, Clemmons; Richard J. Sanchez, and Gregory W. Shepler, both of Lexington, all of N.C., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 19, 1989, Ser. No. 452,866
Int. Cl.[5] C03B *37/02, 37/07*
U.S. Cl. 65—12 **14 Claims**



1. In a method for cooling glass fibers formed from molten glass flowing from a heated fiber glass bushing assembly wherein cooling is accomplished by the transfer of heat to a primary coolant flowing in a primary side of a closed-loop cooling system and subsequently removed to a flow of secondary coolant through at least one heat exchanger having both a primary and secondary side to accommodate the flow of said primary and secondary coolant, the improvement comprising: electronically monitoring the temperature of said primary coolant at a location downstream of said at least one heat exchanger to produce a first electrical signal representative of the temperature of said primary coolant; converting said electrical signal into a measure of temperature; comparing the temperature so measured by means of a programmable controller to a range of pre-programmed temperature limits; and, forwarding a second electrical signal from said programmable controller to a second electronic controller whereby the flow rate of coolant through the secondary side of said at least one heat exchanger is adjusted so as to maintain the temperature of said primary coolant within said prescribed range of pre-programmed temperature limits.

4,995,893

METHOD OF MAKING COATINGS ON GLASS SURFACES

Michael S. Jenkins, Nr. Preston; Andrew F. Simpson, Preston, and David A. Porter, Merseyside, all of England, assignors to Pilkington plc, Merseyside, England

Filed Jun. 22, 1989, Ser. No. 369,739
Claims priority, application United Kingdom, Jun. 23, 1988, 8814922.4
The portion of the term of this patent subsequent to May 9, 2006, has been disclaimed.
Int. Cl.[5] C03B *19/09*
U.S. Cl. 65—18.2 **10 Claims**

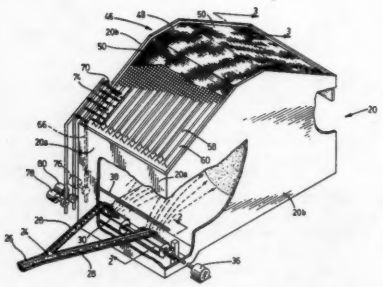
1. A process for forming an underlayer on a glass surface comprising directing on to the hot glass surface at a temperature of 600° C. to 750° C. a gaseous mixture of a silane, an unsaturated hydrocarbon compound and an oxygen-containing gas other than carbon dioxide which does not react chemically with the silane at approximately 20° C. thereby depositing a transparent layer containing silicon and oxygen on the glass surface.

4,995,894

ENCLOSURES FOR SLAG PELLETIZATION APPARATUS AND METHOD OF OPERATION

Kenneth W. Spencer, Ancaster; David T. Horvat, Hamilton, and Peter A. MacKenzie, Stoney Creek, all of Canada, assignors to National Slag Limited, Hamilton, Canada

Filed May 1, 1989, Ser. No. 345,270
Int. Cl.[5] C03B *19/10, 37/005*
U.S. Cl. 65—19 15 Claims



1. A slag pelletization enclosure in combination with a pelletizer for enabling retention within the enclosure of pellets and airborne particulate material created during the operation of the pelletizer, the enclosure comprising:

an enclosure frame;

air impermeable wall members mounted by the frame constituting the walls of the enclosure and defining an enclosure interior;

an open mesh roof member mounted by the frame and through which gases produced as a result of operation of the pelletizer pass in exiting from the enclosure interior; and

baffle means mounted on the enclosure frame beneath at least a portion of the area of the open mesh roof member above and adjacent the pelletizer, the baffle means permitting passage of gases therethrough while preventing passage of pellets and airborne particulate material which impinge thereon.

11. A method of operating a slag pelletization enclosure so as to retain within the enclosure pellets and airborne fibrous particulate material produced therein from slag material by a slag pelletization process, the enclosure comprising:

an enclosure frame;

air impermeable wall members mounted by the frame constituting the walls of the enclosure and defining an enclosure interior;

an oven mesh roof member mounted by the frame and through which pelletization gases pass in exiting from the enclosure interior; and

a rotary pelletizer mounted within the enclosure for projecting slag material that is impinged thereon upward through the air to form the pellets and the fibrous particulate material therefrom during its passage through the air;

the method including providing in the enclosure between the pelletizer and at least a part of the open mesh roof member above and adjacent to the pelletizer baffle means preventing impingement upon the roof member of upwardly projected pellets while permitting the passage therethrough of the exiting gases;

the method also including forming a filter blanket on the open mesh roof member by providing passage through the baffle means of a portion of the airborne fibrous particulate material with the exiting gases so as to deposit on the roof member while removing the remaining portion of the airborne fibrous particulate material from the exiting gases by impingement upon the baffle means and thereby preventing blockage of the open mesh roof member against passage of the exiting gases therethrough.

4,995,895

PROCESS FOR THE MANUFACTURE OF A TOUGHENED AND/OR BENT SHEET OF GLASS WITH A SILVER COATING

Rolf Groth, Bochum, and Thomas Paul, Herne, both of Fed. Rep. of Germany, assignors to Flachglas Aktiengesellschaft, Bayern, Fed. Rep. of Germany

Continuation of Ser. No. 167,655, Mar. 14, 1988, abandoned.
This application Nov. 3, 1989, Ser. No. 431,700
Int. Cl.[5] C03C *17/36;* C03B *23/023*
U.S. Cl. 65—60.2 17 Claims

1. A process for the production of a toughened and/or bent infrared-reflecting sheet of soda lime silicate glass, comprising the steps of:

applying a silver layer on at least one side of an essentially flat glass base;

arranging a metal or metal alloy outer layer outside the silver layer on the side facing away from the glass base, such metal or metal alloy layer being the outermost layer of the total layers applied to the glass base even in such cases in which other layers in addition to the silver layer and the metal or metal alloy layer are applied to the glass base, the metal or metal alloy layer being in direct contact with a surrounding oxygen-containing atmosphere during a toughening and/or bending process; and

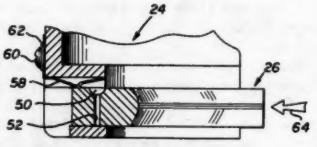
carrying out the toughening and/or bending process at a temperature of from 580° C. to 680° C., whereby the outer metal or metal alloy layer is converted with an increase in volume into an essentially absorption-free metal oxide layer, forming an outermost anti-reflection layer with an index refraction of $\geqq 1.7$, or at least forming an outermost layer of a composite anti-reflection layer which includes the outermost anti-reflection layer as the outermost layer.

4,995,896

TAKEOUT JAWS

Michael L. Denney, Denton; Shelby M. Withrow, Paradise, and John M. Delancey, Sr., Fortworth, all of Tex., assignors to Union Oil Company of California, Los Angeles, Calif.

Filed Aug. 31, 1989, Ser. No. 401,038
Int. Cl.[5] C03B *9/44*
U.S. Cl. 65—260 12 Claims



1. A takeout jaw assembly comprising the combination of

(a) a takeout jaw comprising

a semi-circular base having a wall having front and rear edges;

a semi-circular shelf perpendicular to said wall, forming a pocket with said base;

a top parallel to said base extending from said wall towards said front edge of said base;

a yoke perpendicular to said top and extending therefrom; and

a spring clip attached to the outside of said wall and extending through an opening in said wall formed by cut-outs in said wall, said shelf and said base; and

(b) a non-metallic contact material insert comprising

a semi-circular body having front and rear edges; and

a lug formed at said rear edge of said body by cut-outs therein, said lug having a depression extending substantially parallel to said rear edge of said body;

said spring clip and said depression being in mating relation to retain immovably said insert within said pocket.

4,995,897

METHOD OF MAKING INORGANICALLY CROSSLINKED LAYERED COMPOUNDS

Charles M. Schramm, Cupertino, Calif.; Robert H. Lane, Plano, Tex., and Martin B. Dines, deceased, late of Laguna Beach, Calif. (by Elaine Dines, legal representative), assignors to Occidental Research Corporation, Los Angeles, Calif.

Division of Ser. No. 899,346, Aug. 22, 1986, Pat. No. 4,853,358. This application Jul. 28, 1989, Ser. No. 345,671

Int. Cl.[5] A01N *25/08;* **A61K** *47/02;* **C05G** *5/00*

U.S. Cl. 71—64.11 **8 Claims**

1. A process for encapsulating an active moiety to hinder the egress of said active moiety into the environment which process comprises the steps of

(a) intercalating an active moiety into the layers of a compound selected from the group consisting of compounds represented by the general formula:

$$M(O_3ZO_xR)_n$$

wherein M is a tetravalent metal selected from the group consisting of Zr, W, U, Ti, Th, Te, Sn, Si, Ru, Pu, Pr, Pb, Os, Nb, Mo, Mn, Ir, Hf, Ge and Ce; Z is a pentavalent atom selected from the group consisting of members of Group V of the Periodic Table of the Elements having an atomic weight of at least 30 ; x varies from 0 to 1; R is a radical selected from the group consisting of hydrogen and organo radicals wherein at least a portion of said R radicals comprise a crosslinkable functional group selected from the group consisting of hydroxyl amino, carboxylic acid, epoxide and sulphonyl groups; and n varies from >1 to 2; said compound being characterized as a layered crystalline material comprising contiguous layers, each of said layers being spaced from and substantially unconnected to its neighboring layer to thereby allow access of said active moiety into the interior of said crystalline materials, and

(b) crosslinking said layers to thereby connect said contiguous layers to neighboring layers and hinder egress of said active moiety from the interior of said crystalline material, by reacting said compound with a hydroxy metal complex of aluminum, zirconium, titanium, chromium, zinc, thorium, antimony or mixtures thereof.

4,995,898

IMIDAZOLE COMPOUNDS AND BIOCIDAL COMPOSITION COMPRISING THE SAME FOR CONTROLLING HARMFUL ORGANISMS

Rikuo Nasu; Terumasa Komyoji; Toshio Nakajima; Kazumi Suzuki; Keiichiro Ito; Takeshi Oshima, and Hideshi Yoshimura, all of Shiga, Japan, assignors to Ishihara Sangyo Kaisha, Ltd., Osaka, Japan

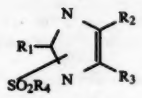
Filed Mar. 14, 1988, Ser. No. 168,070

Claims priority, application Japan, Mar. 13, 1987, 62-58451; Apr. 3, 1987, 62-82546; Apr. 30, 1987, 62-106577

Int. Cl.[5] A01N *43/26;* **C07D** *233/90*

U.S. Cl. 71—90 **9 Claims**

1. An imidazole compound represented by the following general formula (I):



(I)

wherein:

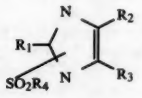
R_1 represents a cyano group or a —CSNHR$_5$ group, wherein R_5 represents a hydrogen atom, a C_{1-4} alkyl group, or a —COR$_6$ group, wherein R_6 represents a C_{1-4} alkyl group, a halogenated C_{1-4} alkyl group, or a phenyl group;

R_2 and R_3 represents a hydrogen atom; a halogen atom; a nitro group; a cyano group; a trimethylsilyl group; a C_{3-6} cycloalkyl group; a naphthyl group; a C_{1-12} alkyl group which is optionally substituted with one or more halogen atoms, hydroxyl groups, acetoxy groups, C_{1-4} alkoxy groups, halogenated C_{1-4} alkoxy groups, phenyl groups, halogenated phenyl groups, or C_{1-4} alkylated phenyl groups; a C_{2-10} alkenyl group which is optionally substituted with one or more halogen atoms; a C_{1-6} alkoxy group which is optionally substituted with one or more halogen atoms; a phenyl group which is optionally substituted with one or more halogen atoms, C_{1-4} alkyl groups, halogenated C_{1-4} alkyl groups, C_{1-4} alkoxy groups, halogenated C_{1-4} alkoxy groups, C_{1-4} alkylthio groups, halogenated C_{1-4} alkylthio groups, nitro groups, cyano groups, or 3,4-methylenedioxy groups; a furyl group which is optionally substituted with one or more halogen atoms or C_{1-4} alkyl groups; a thienyl group which is optionally substituted with one or more halogen atoms or C_{1-4} alkyl groups; a pyridyl group which is optionally substituted with one or more halogen atoms or C_{1-4} alkyl groups; an —SO$_n$R$_7$ group, wherein R_7 represents a C_{1-6} alkyl group, a C_{2-6} alkenyl group, a phenyl group which is optionally substituted with one or more halogen atoms, a benzyl group, a pyridyl group which is optionally substituted with one or more halogen atoms, C_{1-4} alkyl groups, or halogenated C_{1-4} alkyl groups; or an —NR$_8$R$_9$ group, wherein R_8 and R_9 each represents a C_{1-4} alkyl group, and n is 0, 1, or 2; or a —CO(NH)$_m$R$_{10}$ group, wherein R_{10} represents a C_{1-4} alkyl group which is optionally substituted with one or more halogen atoms, a C_{1-4} alkoxy group which is optionally substituted with one or more halogen atoms, or a phenyl group which is optionally substituted with one or more halogen atoms; and m is 0 or 1; and

R_4 represents a C_{1-6} alkyl group which is optionally substituted with one or more halogen atoms; a C_{3-6} cycloalkyl group; a phenyl group; a thienyl group; or an —NR$_{11}$R$_{12}$ group, wherein R_{11} and R_{12} each represents a hydrogen atom, a C_{1-4} alkyl group which is optionally substituted with one or more halogen atoms, a C_{2-4} alkenyl group, of R_{11} and R_{12} are combined with each other together with a nitrogen atom adjacent thereto to form a pyrrolidinyl group, a piperidinyl group, a morpholino group, or a thiomorpholino group, provided that R_{11} and R_{12} are not simultaneously a hydrogen atom;

provided that R_2 and R_3 are not simultaneously a halogen atom.

9. A biocidal composition which comprises an imidazole compound, as an active ingredient, represented by the following general formula (I):



(I)

wherein:

R_1 represents a cyano group or a —CSNHR$_5$ group, wherein R_5 represents a hydrogen atom, a C_{1-4} alkyl group, or a —COR$_6$ group, wherein R_6 represents a C_{1-4} alkyl group, a halogenated C_{1-4} alkyl group, or a phenyl group;

R_2 and R_3 each represents a hydrogen atom; a halogen atom; a nitro group; a cyano group; a trimethylsilyl group; a C_{3-6} cycloalkyl group; a naphthyl group; a C_{1-12} alkyl group which is optionally substituted with one or more halogen atoms, hydroxyl groups, acetoxy groups, C_{1-4} alkoxy groups, halogenated C_{1-4} alkoxy groups, phenyl groups, halogenated phenyl groups, or C_{1-4} alkylated phenyl groups; a C_{2-10} alkenyl group which is optionally substituted with one or more halogen atoms; a C_{1-6} alkoxy group which is optionally substituted with one or more halogen atoms; a phenyl group which is optionally substituted with one or more halogen atoms, C_{1-4} alkyl groups, halogenated C_{1-4} alkyl groups, C_{1-4} alkoxy groups, halogenated C_{1-4} alkoxy groups, C_{1-4} alkylthio groups, halogenated C_{1-4} alkylthio groups, nitro groups, cyano groups, or 3,4-methylenedioxy groups; a furyl group which is optionally substituted with one or more halogen atoms or C_{1-4} alkyl groups; a thienyl group which is optionally substituted with one or more halogen atoms or C_{1-4} alkyl groups; a pyridyl group which is optionally substituted with one or more halogen atoms or C_{1-4} alkyl groups; an —SO$_n$R$_7$ group, wherein R_7 represents a C_{1-6} alkyl group, a C_{2-6} alkenyl group, a phenyl group which is optionally substituted with one or more halogen atoms, a benzyl group, a pyridyl group which is optionally substituted with one or more halogen atoms, C_{1-4} alkyl groups, or halogenated C_{1-4} alkyl groups; or an —NR$_8$R$_9$ group, wherein R_8 and R_9 each represents a C_{1-4} alkyl group, and n is 0, 1, or 2; or a —CO(NH)$_m$R$_{10}$ group, wherein R_{10} represents a C_{1-4} alkyl group which is optionally substituted with one or more halogen atoms, a C_{1-4} alkoxy group which is optionally substituted with one or more halogen atoms, or a phenyl group which is optionally substituted with one or more halogen atoms; and m is 0 or 1; and

R_4 represents a C_{1-6} alkyl group which is optionally substituted with one or more halogen atoms; a C_{3-6} cycloalkyl group; a phenyl group; a thienyl group; or an —NR$_{11}$R$_{12}$ group, wherein R_{11} and R_{12} each represents a hydrogen atom, a C_{1-4} alkyl group which is optionally substituted with one or more halogen atoms, a C_{2-4} alkenyl group, or R_{11} and R_{12} are combined with each other together with a nitrogen atom adjacent thereto to form a pyrrolidinyl group, a piperidinyl group, a morpholino group, or a thiomorphol group, provided that R_{11} and R_{12} are not simultaneously a hydrogen atom;

provided that R_2 and R_3 are not simultaneously a halogen atom; and adjuvants.

4,995,899

OPTICALLY ACTIVE DIAZABICYCLOALKANE DERIVATIVES AND THEIR USE FOR PROTECTING CROPS FROM THE PHYTOTOXIC EFFECT OF HERBICIDES

Herbert Scholz, Neustadt; Adolf Zeidler, Ludwigshafen; Bruno Wuerzer, Otterstadt, and Norbert Meyer, Ladenburg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 3,708, Jan. 15, 1987, abandoned. This application Apr. 6, 1989, Ser. No. 334,814

Int. Cl.[5] A01N *43/54, 43/50;* **C07D** *487/04, 471/04*

U.S. Cl. 71—92 **3 Claims**

1. A method of protecting corn plants from the phytotoxic action of a herbicide selected from the group consisting of 2-chloro-2',6'-dimethyl-N-(pyrazol-1-yl-methyl)acetanilide and 2-chloro-2'-methyl-6'-ethyl-N-(ethoxymethyl)acetanilide, which method comprises treating corn plants, their seed or the location with an effective amount of optically active R(−)-5-dichloroacetyl-3,3,6-trimethyl-9-oxo-1,5-diazabicyclo[4.3.0-]nonane.

4,995,900

HERBICIDAL AQUEOUS BASED MICROEMULSION COMPOSITIONS

Ian Futcher, Fareham, United Kingdom, assignor to American Cyanamid Company, Stamford, Conn.

Filed Nov. 30, 1988, Ser. No. 278,302

Int. Cl.[5] A01N *43/48*

U.S. Cl. 71—92 **7 Claims**

1. A herbicidal aqueous-based microemulsion comprising on a weight to volume basis about 20% to 40% of a 1,2-dimethyl-3,5-diphenylpyrazolium salt; about 5% to 25% of at least one essentially water insoluble herbicidally active ingredient selected from the group consisting of esters of 2,4-D acid; about 5% to 40% of at least one nonionic surfactant; and 0% to about 25% of adjuvants.

4,995,901

HERBICIDAL SULFONAMIDES

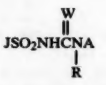
Morris P. Rorer, Newark, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 204,556, Jun. 15, 1988, Pat. No. 4,906,282, which is a continuation-in-part of Ser. No. 78,191, Jul. 27, 1987, abandoned. This application Jan. 5, 1990, Ser. No. 461,581

Int. Cl.[5] A01N *43/66;* **C07D** *401/12, 403/12, 409/12*

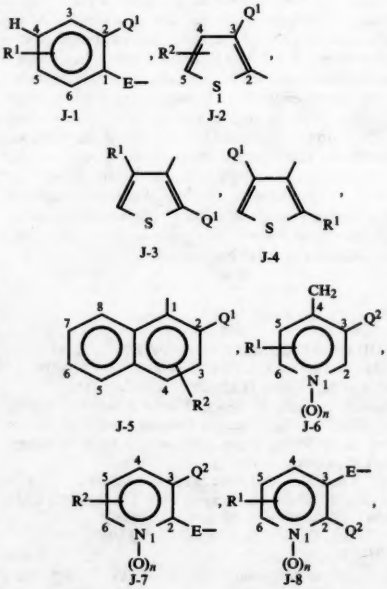
U.S. Cl. 71—93 **22 Claims**

1. A compound having the formula

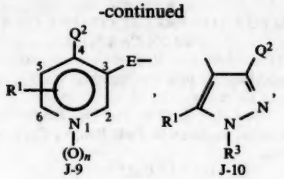


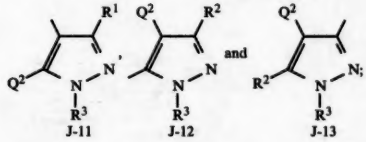
and agriculturally suitable salts thereof wherein:

J is selected from



-continued





E is a single bond or —CH_2—;

Q^1 is —$C(T^1)$=N—O—Alk;

T^1 is selected from CN, F, Cl, Br, SCN, N_3, C_1 to C_2 alkoxy, C_1 to C_2 thioalkyl, NH(C_1 to C_2 alkyl), N(C_1 to C_2 alkyl)$_2$, $N(OCH_3)CH_3$ and

or 4;

Alk is selected from C_1 to C_3 alkyl, optionally substituted with CN, OCH_3, SCH_3 or halogen; and CH_2CH=CH_2;

Q^2 is —$C(T^2)$=N—O—Alk;

T^2 is selected from H; C_1 to C_3 alkyl optionally substituted with CN, OCH_3, SCH_3 or halogen; cyclopropyl; F; Cl; Br; CN; SCN; N_3; C_1 to C_2 alkoxy; C_1 to C_2 thioalkyl; NH(C_1 to C_2 alkyl); N(C_1 to C_2 alkyl)$_2$; $N(OCH_3)CH_3$ and

or 4;

R^1 is selected from H, C_1 to C_3 alkyl, C_1 to C_3 haloalkyl, halogen, CN, nitro, C_1 to C_3 alkoxy, C_1 to C_3 haloalkoxy, C_1 to C_3 alkylthio, C_1 to C_3 alkylsulfinyl, C_1 to C_3 alkylsulfonyl, SCF_2H, NH_2, $NHCH_3$, $N(CH_3)_2$ or C_1 to C_2 alkyl substituted with one C_1 to C_2 alkoxy, C_1 to C_2 haloalkoxy, SH, SCH_3, CN or OH;

R^2 is selected from H, F, Cl, Br, C_1 to C_2 alkyl, C_1 to C_2 haloalkyl or C_1 to C_2 alkoxy;

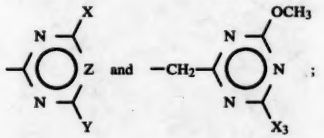
R^3 is selected from H, C_1 to C_3 alkyl, C_1 to C_2 haloalkyl, C_3 to C_4 alkenyl, C_3 to C_4 alkynyl, CH_2CN, phenyl and phenyl substituted by F, Cl, CH_3 or OCH_3;

n is 0 or 1;

R is H or CH_3;

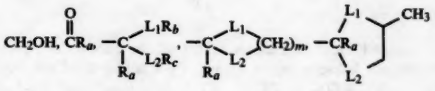
W is O or S;

A is selected from



X is selected from H, C_1 to C_4 alkyl, C_1 to C_4 alkoxy, C_2 to C_4 haloalkoxy, C_1 to C_4 haloalkyl, C_1 to C_4 haloalkylthio, C_1 to C_4 alkylthio, C_2 to C_5 alkoxyalkyl, C_2 to C_5 alkoxyalkoxy, amino, C_1 to C_3 alkylamino, di(C_1 to C_3 alkyl)amino or C_3 to C_5 cycloalkyl;

Y is selected from H, C_1 to C_4 alkyl, C_1 to C_4 alkoxy, C_2 to C_4 haloalkoxy, C_1 to C_4 haloalkylthio, C_1 to C_4 alkylthio, C_2 to C_5 alkoxyalkyl, C_2 to C_5 alkoxyalkoxy, amino, C_1 to C_3 alkylamino, di(C_1 to C_3 alkyl)amino, C_3 to C_4 alkenyloxy, C_3 to C_4 alkynyloxy, C_2 to C_5 alkylthioalkyl, C_1 to C_4 haloalkyl, C_2 to C_4 alkynyl, azido, cyano, C_2 to C_5 alkylsulfinylalkyl, C_2 to C_5 alkylsulfonylalkyl,



and $N(OCH_3)CH_3$;

m is 2 or 3;

L_1 and L_2 are independently O or S;

R_a is H or C_1 to C_3 alkyl;

R_b and R_c are independently C_1 to C_3 alkyl;

Z is N; and

X_3 is CH_3 or OCH_3;

wherein further:

(i) when W is S, then R is H, A is A-1 and Y is CH_3, OCH_3, OC_2H_5, CH_2OCH_3, C_2H_5, CF_3, SCH_3, OCH_2CH=CH_2, OCH_2C≡CH, $OCH_2CH_2OCH_3$, $CH(OCH_3)_2$ or 1,3-dioxolan-2-yl;

(ii) when the total number of carbons of X and Y is greater than four, the number of carbon atoms of Q^1 or Q^2 is less than or equal to four; and

(iii) when J is J-6, J-7, J-8 or J-9, and A is A-1, and X and Y are haloalkoxy or haloalkylthio, then T^2 is F, Cl, Br, CN, SCN, N_3, C_1 to C_2 alkoxy, C_1 to C_2 thioalkyl, NH(C_1 to C_2 alkyl), N(C_1 to C_2 alkyl)$_2$, $N(OCH_3)CH_3$ or

or 4.

4,995,902

NOVEL HERBICIDES

Hans-Georg Brunner, Lausen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

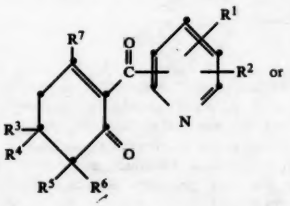
Filed Jul. 11, 1989, Ser. No. 378,119

Claims priority, application Switzerland, Jul. 25, 1988, 2825/88; Jan. 5, 1989, 29/89

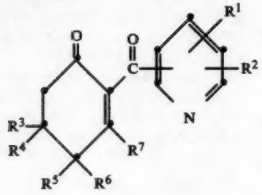
Int. Cl.[5] **C07D** *213/50;* **A01N** *43/40*

U.S. Cl. 71—94 **15 Claims**

1. A compound of formula I or I'



-continued



in which R^1 and R^2 independently of one another are each hydrogen; halogen; nitro; cyano; C_1–C_4alkyl; C_1–C_4alkoxy; C_1–C_4alkyl-$S(O)_n$—; COR^8; C_1–C_4haloalkoxy; or C_1–C_4haloalkyl; R^3, R^4 and R^5 independently of one another are each hydrogen; C_1–C_4alkyl; or phenyl or benzyl each unsubstituted or substituted by up to three identical or different substituents from halogen, nitro, cyano, C_1–C_4alkyl, C_1–C_4alkoxy, C_1–C_4alkyl-$S(O)_n$—, C_1–C_4haloalkyl, C_1–C_4haloalkyl-$S(O)_n$— and C_1–C_4haloalkoxy; R^6 is hydrogen; C_1–C_4alkyl; C_1–C_4alkoxycarbonyl; or cyano; R^7 is OH; or $O^{\ominus}M^{\oplus}$; R^8 is OH; C_1–C_4alkoxy; NH_2; C_1–C_4alkylamino; or di-C_1–C_4alkylamino; n is 0, 1 or 2; $M^{\oplus}$ is a cation equivalent of a metal ion or of an ammonium ion that is unsubstituted or substituted by up to three C_1–C_4alkyl, C_1–C_4hydroxyalkyl or C_1–C_4alkoxy-C_1–C_4alkyl groups.

4,995,903

ALKYL-, ALKENYL- AND ALKYNYLNITROGUANIDINES AS CYTOKININ PLANT GROWTH REGULANTS

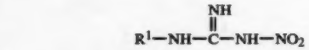
Albert W. Lutz, Princeton, N.J., and Shirley J. Rodaway, Newtown, Pa., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 23,348, Mar. 9, 1987, Pat. No. 4,822,408, which is a division of Ser. No. 759,705, Jul. 29, 1985, Pat. No. 4,667,226. This application Nov. 23, 1988, Ser. No. 275,165

Int. Cl.[5] A01N *33/02*

U.S. Cl. 71—121 **4 Claims**

1. A method for inhibiting deterioration of fresh, leafy vegetables, ornamental foliage and fresh, green, newly harvested livestock feed, comprising applying thereto a preservative amount of a substituted nitroguanidine compound, wherein the nitroguanidine compound is



wherein

R^1 is C_1–C_6 alkyl, optionally substituted with from one to three OH, halogen or C_1–C_3 alkoxy groups; C_2–C_6 alkenyl optionally substituted with from one to three OH, halogen or C_1–C_3 alkoxy groups or C_2–C_6 alkynl, optionally substituted with from one to three OH, halogen or C_1–C_3 alkoxy groups; or the salts, geometric isoners, optical isomers or tautomers thereof.

4,995,904

METHOD FOR THE PRETREATMENT OF A LUMPY CARBON CARRIER

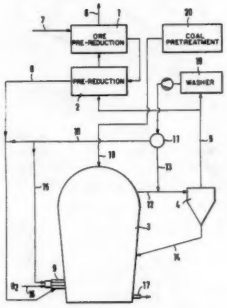
Rolf Hauk, Düsseldorf, Fed. Rep. of Germany, assignor to Deutsche Voest-Alpine Industrieanlagenbau GmbH, Duesseldorf, Fed. Rep. of Germany

Filed Nov. 2, 1988, Ser. No. 266,088

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1987, 3737262

Int. Cl.[5] C21B *11/00*

U.S. Cl. 75—445 **7 Claims**



1. A process for producing pig iron from iron ore, comprising the steps of:

a. pre-reducing iron ore in at least one reduction step to produce sponge iron,

b. transporting the sponge iron into a melt-down gasifier,

c. pre-treating fine coal having a grain size of less than 1 mm by granulating a mixture of ground fine coal and a binder into lumps to produce a lumpy carbon carrier suitable for the formation of a fluidized bed, the pre-treating step occurring separate from the pre-reducing step,

d. introducing the pre-treated lumpy carbon carrier into the upper part of the melt-down gasifier to form, together with the sponge iron, a fluidized bed and a solid bed of carbon carrier underneath the fluidized bed, and

e. introducing an oxygen-containing gas into the lower part of the melt-down gasifier for finally reducing and fusing the sponge iron with the aid of the lump carbon carrier.

4,995,905

PERMANENT MAGNET HAVING IMPROVED HEAT-TREATMENT CHARACTERISTICS AND METHOD FOR PRODUCING THE SAME

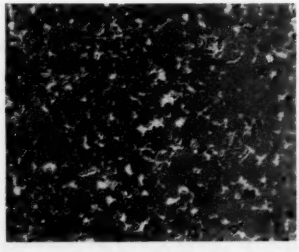
Masato Sagawa, Kyoto, Japan, assignor to Masato Sagawa, Japan

Filed May 23, 1989, Ser. No. 355,759

Claims priority, application Japan, Oct. 6, 1988, 63-250851

Int. Cl.[5] C22C *29/14*

U.S. Cl. 75—244 **16 Claims**



1. An R—Fe—B magnet comprising 11–18 at % R, wherein

R is one or more rare-earth elements excluding Dy, with the proviso that at least 80 at % and up to 100 at % of the total R are Nd, Pr or mixtures thereof; 6–12 at % B, and the balance is Fe and Co such that Co is 0–25 at % and impurities.

further comprising V in an amount of from 2 to 6 at % and Cu in an amount of from 0.01 to 1 at %, a V—T—B compound minority phase, wherein T is Fe, Co or mixtures thereof, being finely dispersed in the magnet and the magnet exhibiting a maximum energy product (BH) max of 20 MGOe or more and a coercive force (iHc) of 15 kOe or more.

4,995,906

METHOD FOR SMELTING REDUCTION OF IRON ORE

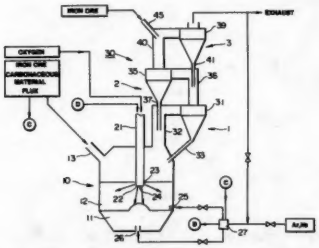
Katsuhiro Iwasaki; Kenji Takahashi; Shigeru Inoue; Haruyoshi Tanabe; Masahiro Kawakami, and Osamu Terada, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Dec. 12, 1988, Ser. No. 283,218

Claims priority, application Japan, Dec. 18, 1987, 62-322321; Dec. 18, 1987, 62-322322; Dec. 18, 1987, 62-322328

Int. Cl.[5] C21B *11/00*

U.S. Cl. 75—502 **32 Claims**



1. A method for smelting reduction of iron ore in a smelting reduction furnace comprising

preheating and prereducing iron ore in at least one preheat and prereduction furnace to achieve up to 30% of the total reduction of said iron ore by contacting said iron ore with a gas exhausted from said smelting reduction furnace;

charging the preheated and prereduced iron ore, carbonaceous material and flux into a smelting reduction furnace containing molten metal in the bottom thereof and a slag layer on said molten metal;

blowing decarburizing oxygen and post-combusting oxygen through a tip of a top blown oxygen lance into the smelting reduction furnace to reduce the preheated and prereduced iron ore to molten metal and to melt the flux into slag, the decarburizing oxygen being blown through decarburizing nozzles placed at a central portion of the tip of the top blown oxygen lance and the post-combusting oxygen being blown through post-combustion nozzles placed at the central portion spaced outwardly from the decarburizing nozzles; the tip of the top blown oxygen lance being positioned between the upper surface and the lower surface of said slag layer;

blowing in stirring gas through at least one side tuyere placed in a side wall of the smelting reduction furnace and at least one bottom tuyere placed in the bottom of the smelting reduction furnace; said stirring gas blown through said at least one bottom tuyere passing upward through said molten metal and causing a portion of the upper surface of said molten metal to swell upwardly, at least part of said stirring gas blown through the at least one side tuyere being directed at said upwardly swollen portion of the molten metal to agitate said molten metal and the slag layer to cause droplets of said molten metal to move into said slag layer;

the stirring gas being at least one gas selected from the group consisting of Ar, N_2, CO, CO_2 and process gas;

controlling flow rates of the post-combusting oxygen and the stirring gas to form an exhaust gas in the smelting reduction furnace which has an oxidation degree of from 0.4 to 0.9, said oxidation degree being determined by the formula:

$$(H_2O+CO_2)/(H_2+H_2O+CO+CO_2);$$

controlling the temperature of said, exhaust gas in the smelting reduction furnace to a temperature of from 300° to 1300° C.;

and cycling said infurnace gas to said preheat and prereduction furnace.

4,995,907

METHOD OF DEOXIDING AND ALLOYING STEEL

Wilfried Pirklbauer, Niederneukirchen, Austria, assignor to Voest-Alpine Industrieanlagenbau Gesellschaft m.b.H., Linz, Austria

Filed Mar. 22, 1990, Ser. No. 497,337

Claims priority, application Austria, Mar. 23, 1989, 687/89

Int. Cl.[5] C21C *7/02*

U.S. Cl. 75—561 **5 Claims**

1. In a method of deoxidizing and alloying steel by preparing molten crude steel having an oxygen content of at least 200 ppm, adding deoxidizing agents to said molten crude steel, and subsequently adding alloying agents, the improvement wherein FeSi and FeMn are simultaneously added as said deoxidizing agents at a ratio that at least partially yields liquid deoxidation products during deoxidizing.

4,995,908

DICHLOROTRIFLUOROETHANE-CONTAINING MIXTURES

Hans Buchwald, Ronnenberg, and Boleslaus Raschkowski, Wiedensahl, both of Fed. Rep. of Germany, assignors to Kali-Chemie AG, Hanover, Fed. Rep. of Germany

Filed Sep. 8, 1988, Ser. No. 241,469

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1987, 3731223

Int. Cl.[5] B28B *7/36*

U.S. Cl. 106—38.22 **17 Claims**

1. A liquid composition consisting essential a single halogenated hydrocarbon solvent consisting of dichlorotrifluoroethane and from 0.1 to 80% by weight relative to the total mixture of at least one release effective agent selected from the group consisting of waxes, wax derivatives, metal soaps and silicones.

4,995,909

CATIONIC SLURRY SEAL EMULSIFIERS

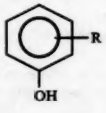
Peter Schilling, Charleston, S.C., assignor to Westvaco Corporation, New York, N.Y.

Division of Ser. No. 334,464, Apr. 7, 1989, abandoned. This application Aug. 28, 1989, Ser. No. 401,551

Int. Cl.[5] C08L *95/00*

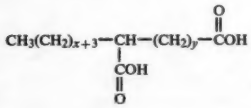
U.S. Cl. 106—277 **14 Claims**

1. A bituminous emulsion comprising from about 30% to about 80% by weight of bitumen, from about 0.1% to about 10% by weight of an cationic emulsifier comprising the reaction product of (a) an alkyl phenol of the general form

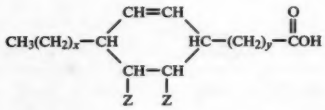


where R represents a linear or branched alkyl group, (b) an aldehyde, and, (c) the reaction product of a polyamine

and a compound selected from the group of a tall oil fatty acid, a polycarboxylic acid corresponding to the formula



and a polycarboxylic acid corresponding to the formula



wherein x and y are integers from 3 to 9, x and y together equal 12, at least one Z is a carboxylic acid group and any remaining Z is hydrogen, and water to make up 100% by weight.

4,995,910

NON-STICK COATING COMPOSITION AND METHOD FOR THERMOPLASTIC MATERIALS

James B. Krug, Pequea; Ronald S. Lenox, and William J. Stewart, both of Lancaster, all of Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.

Continuation-in-part of Ser. No. 186,913, Apr. 27, 1988, abandoned, which is a division of Ser. No. 53,897, May 26, 1987, Pat. No. 4,830,884. This application Aug. 7, 1989, Ser. No. 390,173

Int. Cl.[5] C09K *3/00*

U.S. Cl. 106—287.32 **18 Claims**

1. A coating system on a thermoplastic comprising: a mixture of (1) a salt selected from the group consisting of: (a) a hydroxy alkyl sulfonate salt and (b) an alkyl sulfonate salt and (2) an alkyl sulfate salt; said mixture being a coating on a thermoplastic surface of the thermoplastic, wherein there is a concentration ratio for the sulfonate salt of (1) to the sulfate salt of (2) of at least 1:1, and further that the said mixture is present in an amount that is effective to form a protective coat that gives non-stick protection to the thermoplastic, further providing that the thermoplastic is a material which, in storage, undesirably sticks to another thermoplastic surface.

4,995,911

PROCESS FOR RECOVERING UNREACTED SUCROSE FROM REACTION MIXTURE IN SYNTHESIS OF SUCROSE FATTY ACID ESTERS

Shusaku Matsumoto, Kyoto; Yoshio Hatakawa, Higashiosaka, and Akihiko Nakajima, Kyoto, all of Japan, assignors to Dai-Ichi Kogyo Seiyaku Co., Ltd., Kyoto, Japan

Filed Jun. 13, 1989, Ser. No. 365,644

Claims priority, application Japan, Jun. 14, 1988, 63-146586

Int. Cl.[5] C13D *3/00, 3/16*

U.S. Cl. 127—48 **10 Claims**

1. A process for recovering unreacted sucrose from the reaction mixture produced in the synthesis of a sucrose fatty acid ester by a reaction of sucrose and a fatty acid alkyl ester in an organic solvent, said reaction mixture containing an unreacted fatty acid alkyl ester, a catalyst, a soap, a fatty acid and a volatile component which comprises steps of:

(a) adjusting the reaction mixture to a substantially neutral pH between 6.2 and 8.2;

(b) adding water, a neutral salt and sucrose to the reaction mixture in amounts satisfying the following equations:

$$\frac{x}{x+y+z} = 0.015 \text{ to } 0.12,$$

-continued

$$\frac{y}{x+y+z} = 0.025 \text{ to } 0.20,$$

and

$$\frac{x}{y} = 0.4 \text{ to } 0.6$$

wherein, x is an amount which is the sum of the neutral salt to be added and the salt formed by neutralization of catalyst used in the synthesis of sucrose fatty acid ester, y is an amount which is the sum of sucrose to be added and the unreacted sucrose present from the beginning, and z is the total amount of water to precipitate the sucrose fatty acid ester;

(c) filtering off the resulting precipitate; and

(d) enriching the recovered sucrose by contacting the filtrate with a reverse osmosis membrane, wherein said membrane has a fractionation molecular weight of 150 to 200 and wherein said filtrate is maintained at a pH of 6.2 and 8.2 and at temperature of 40° to 60° C. during contact with the membrane.

4,995,912

MILL SCALE DE-OILING

Michael Goss, Houston, and John E. Mincy, Richmond, both of Tex., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Jan. 29, 1990, Ser. No. 471,344

Int. Cl.[5] C22B *7/00*

U.S. Cl. 134—2 **4 Claims**

1. A process for removing oily contaminants from mill scale containing from 0.1 to about 10 weight percent oily contaminants which process consists essentially of:

(a) suspending oily mill scale in water containing an effective de-oiling amount of a formulation consisting essentially of the ingredients:

Ingredients	Percent
(1) medium aliphatic naphtha	30–60
(2) heavy aromatic naphtha	1–7.5
(3) linear and branched alkyl phenols	5–15
(4) alkoxylated alkyl phenols	5–20
(5) penta ethylene hexamine partial fatty acid amide	0.5–2.0
(6) alkyl and aromatic acid imidazolines	1–5.0

thereby forming an oily mill scale suspension; then

(b) mixing said suspension to achieve dissolution and emulsion suspension of oily contaminants in water, thereby forming a de-oiled mill scale suspended in oily water,

(c) separating the de-oiled mill scale from the oily water, and

(d) optionally water rinsing the de-oiled mill scale to form a rinsed mill scale

(e) treating the oily water to remove oily contaminants from the oily water thereby recovering waste oils and treated fresh water, and then

(f) recycling at least a portion of the treated fresh water to form the oily mill scale suspension of step (a), and recovering the waste oils.

4,995,913

LOW WASH WATER SILVER HALIDE FILM PROCESSOR

Daniel F. Juers, Fairport, N.Y., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 28, 1989, Ser. No. 316,656
Int. Cl.[5] B08B *7/04*
U.S. Cl. 134—13 **7 Claims**

1. A method for processing film in a photographic film processor using a number of wash stages including a first and a last stage in a countercurrent wash arrangement, the method comprising:

a. contacting the film with developer solution;

b. contacting the film with fixing solution containing thiosulfate;

c. determining the number of wash stages (n);

d. selecting a level of residual thiosulfate (R) to be left on processed film;

e. determining concentration of thiosulfate (C_f) in the fixing solution;

f. determining an amount of wash water (V_c) to be circulated through the wash stages;

g. selecting film processing rate (A_r);

h. circulating the wash water through the wash stages and replenishing the wash water with a flow rate (V_r) such that

$$\frac{C_f V_c}{R} = \sum_{k=o}^{n} \left(\frac{V_r}{V_c A_r} \right)^k ; \text{ and}$$

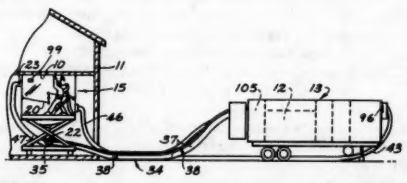
i. washing the film with the wash water in the wash stages in a direction generally counter to the circulation of the wash water through the wash stages.

4,995,914

PROCESS FOR REMOVING HAZARDOUS OR TOXIC MATERIAL FROM A STRUCTURE

Bruce W. Teter, 11615 Eastshore Dr., Hayden Lake, Id. 83835

Division of Ser. No. 897,641, Aug. 18, 1986, Pat. No. 4,774,974, which is a continuation-in-part of Ser. No. 720,875, Apr. 10, 1985, abandoned. This application Jul. 20, 1988, Ser. No. 222,012
Int. Cl.[5] B08B *5/04*
U.S. Cl. 134—21 **8 Claims**



1. A process for removing hazardous or toxic materials from a surface comprising the steps of:

establishing a substantially air-tight enclosed area about the materials to be removed;

placing the materials into an intake tube having one end opening into the enclosed area and extending from the enclosed area to a remaining end connected to a separator chamber including a collection tank remote from the enclosed area;

drawing air from the enclosed area through the intake tube and into the separator chamber and thereby moving the materials within the intake tube in a direction of flow to a collection tank within the separator chamber and producing a pressure differential within the enclosed area such that the air pressure within the enclosed area is lower than ambient pressure;

filtering the air received from the intake tube through a submicronic air filter to clear the air by removing materials therefrom; and

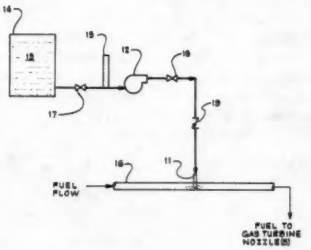
returning at least a portion of the filtered air through a return air tube extending from the separator chamber to the enclosed area to provide make-up air to the enclosed area.

4,995,915

CLEANING GAS TURBINE FUEL NOZZLES

Charles A. Sewell, Lake Jackson, and Robert D. Toles, Angleton, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 15, 1988, Ser. No. 220,047
Int. Cl.[5] B08B *3/08*
U.S. Cl. 134—22.14 **7 Claims**



1. A process for on-line cleaning of gas turbine fuel nozzles comprising injecting a sufficient amount of a fluid cleaning medium into a fuel system of an operating gas turbine at a rate sufficient to reduce deposits on the gas turbine fuel nozzles.

4,995,916

METHOD OF RECOVERING HAZARDOUS WASTE FROM PHENOLIC RESIN FILTERS

David H. Meikrantz; Gary L. Bourne, both of Idaho Falls, Id.; John N. McFee, Albuquerque, N. Mex.; Bradley G. Burdge, and John W. McConnell, Jr., both of Idaho Falls, Id., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 30, 1990, Ser. No. 516,936
Int. Cl.[5] B08B *9/00*
U.S. Cl. 134—22.16 **7 Claims**

7. A method of removal and recovery of hazardous material from a phenolic resin filter in a filter cartridge housing comprising:

circulating an aqueous solution of 8 to 12M nitric acid through the housing, said solution being at a temperature of 160° to 190° F.,

maintaining the circulation for a period of time sufficient to solubilize the filter material and release the hazardous material,

removing the solubilized filter material and hazardous material from the housing, and

separating the hazardous material from the solubilized filter material.

4,995,917

MANUFACTURING PROCESS FOR DIE-CAST LIGHT-METAL WHEELS OF PASSENGER CARS

Amer Dagustany, Munich; Jochen Spriestersbach, Wendelstein; Bernd Günther, Garching, and Gerhard Knall, Munich, all of Fed. Rep. of Germany, assignors to Bayerische Motoren Werke Aktiengesellschaft, Fed. Rep. of Germany

PCT No. PCT/EP88/00675, § 371 Date Mar. 27, 1989, § 102(e) Date Mar. 27, 1989

PCT Filed Jul. 26, 1988, Ser. No. 335,781

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1987, 3724928

Int. Cl.[5] C22F *1/43*

U.S. Cl. 148—3 16 Claims

1. A manufacturing process for diecasting of light-metal wheels of passenger cars, using a known, almost eutectic refined AlSi alloy, which has approximately 9.5% to 12.5% parts by weight of silicon and at least 0.05 to 0.15% parts by weight of magnesium, as well as no more than from 0.00 to 0.05% parts by weight of each other impurity and a total of no more 0.15% parts by weight of such other impurities, comprising the steps of

die-casting the alloy;

allowing the alloy to solidify;

after solidification, removing the wheels casting from the casting die;

immediately quenching the wheel casting in water before the wheel casting reaches a temperature measured at its surface, of at least 380° C. at interior areas and areas with concentrations of mass; and

allowing the wheel casting to cool.

4,995,918

PROCESS AND DEVICE FOR AUTOGENOUS CUTTING WITH LIQUID OXYGEN

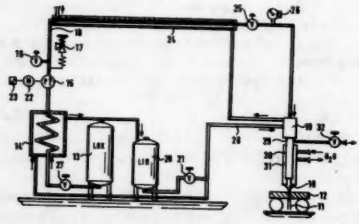
Paul Grohmann, Maria-Enzersdorf, Austria, assignor to Messer Grieshiem GmbH, Fed. Rep. of Germany

Filed Jul. 31, 1989, Ser. No. 386,943

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1988, 3827417

Int. Cl.[5] B23K *7/00*

U.S. Cl. 148—9 R 12 Claims



1. In a process for autogenous cutting, in which the oxygen in liquid form is put under high pressure and flows to the cutting site through a liquid jet cutting nozzle, the improvement being in that the liquid oxygen jet emerging from the nozzle is supercooled and has a temperature that lies below the boiling temperature of the oxygen at ambient pressure to increase the cutting speed and the quality level of the liquid oxygen autogenous cutting.

4,995,919

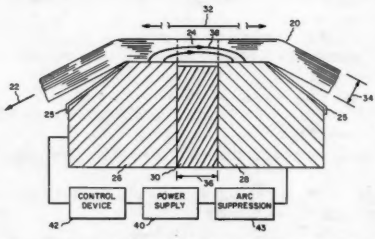
METHOD AND APPARATUS FOR PARTING A DECK OF AMORPHOUS ALLOY RIBBONS

Alan I. Taub, Schenectady, N.Y.; Peter G. Frischmann, Scottsdale, Ariz., and Minyoung Lee, Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 17, 1989, Ser. No. 339,039

Int. Cl.[5] B23K *7/00*

U.S. Cl. 148—9 R 15 Claims



1. A method for severing a deck of amorphous alloy ribbons along an intended seam, said seam being located within a predetermined zone that traverses said deck in its width and height dimensions; said method comprising:

placing said deck under tension by the application of a tensile force of predetermined direction and magnitude;

placing said deck under compression along said height dimension throughout a region of said deck encompassing said zone to reduce interfacial electrical resistance between said ribbons in said region;

applying a heating current to pass through the deck in said zone to resistance heat said zone while said deck is under said tension and compression; and

controlling the duration and amplitude of said current to heat said zone to a temperature within the range of softening temperatures of said amorphous alloy at a predetermined rate, said heating rate being selected to allow separation of said deck to occur along said seam within a time period less than about one half of one second upon the application of said tensile force.

4,995,920

PROCESS FOR THE PRODUCTION OF ALUMINUM ALLOYS BY SPRAY DEPOSITION

Jean-Francois Faure, Voiron, and Bruno Dubost, Maison Lafitte, both of France, assignors to Pechiney Recherche Groupement D'Interet Economique, Paris, France

Filed Dec. 14, 1989, Ser. No. 450,525

Claims priority, application France, Dec. 19, 1988, 88 17044

Int. Cl.[5] B22F *1/00*

U.S. Cl. 148—12.7 A 11 Claims

1. A process for the production of alloys of Al in the series 7000 with a high level of strength and good ductility, comprising the steps of:

(a) forming, by spray deposition, a solid alloy consisting essentially of, by weight:

Zn	from 8.5 to 15.0%
Mg	from 2.0 to 4.0%
Cu	from 0.5 to 2.0%

at least one of the elements selected from the group consisting of Zr, Mn and Cr in the amounts:

Zr	from 0.05 to 0.8%
Mn	from 0.05 to 1.0%
Cr	from 0.05 to 0.8%

with Zr + Mn + Cr ≦ 1.4%

-continued

Fe	up to 0.5%
Si	up to 0.5%
others (impurities)	≦ 0.05% each ≦ 0.15% total
balance Al;	

(b) subjecting said solid alloy to transformation in the hot condition at between 300° and 450° C. and optionally in the cold condition, and

(c) subjecting said transformed alloy to heat treatment by solution treatment, quenching and ageing.

4,995,921

SOLDER PASTES USING ALCOHOL BLENDS AS RHEOLOGICAL AIDS

James L. Davis, Tamarac; Robert W. Pennisi, Boca Raton; Fadia Nounou, Plantation, and Bobby D. Landreth, Davie, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 11, 1990, Ser. No. 521,871

Int. Cl.[5] B23K *35/34*

U.S. Cl. 148—22 **30 Claims**

1. A vehicle for powdered solder for solder pastes comprising:

a low viscosity, monofunctional alcohol solvent, having a room temperature

viscosity of between about 3 and about 20 centipoise; and

a relatively high viscosity polyfunctional alcohol thickener having at least two hydroxyl groups, and having a room temperature viscosity of between about 20 to about 1500 centipoise.

4,995,922

OXIDE-DISPERSION-HARDENED SUPERALLOY BASED ON NICKEL

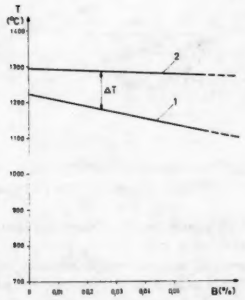
Peter Jongenburger, Baden, Switzerland, assignor to Asea Brown Boveri Ltd., Baden, Switzerland

Filed Jan. 11, 1989, Ser. No. 295,559

Claims priority, application Switzerland, Jan. 18, 1988, 159/88

Int. Cl.[5] C22C *19/05*

U.S. Cl. 148—428 **19 Claims**



1. An oxide-dispersion-hardened superalloy based on nickel which is composed of the following main constituents:

Cr =	5–13.95 percent by weight
Al =	2.5–7 percent by weight
Mo =	0–2 percent by weight
W =	0–15 percent by weight
Ta =	0–7 percent by weight
Hf =	0–1 percent by weight

-continued

Ti =	0–3 percent by weight
Zr =	0.02–0.2 percent by weight
Co =	0–10 percent by weight
C =	0–0.2 percent by weight
Y_2O_3 =	1–2 percent by weight
Ni =	Remainder,

which additionally contains boron in a content of 0.026 to 0.3 percent by weight.

4,995,923

THIN FILM OF AMORPHOUS ALLOY

Kunihiko Mizumoto; Koichi Haruta, and Hirokazu Kajiura, all of Ichihara, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Oct. 17, 1988, Ser. No. 258,721

Int. Cl.[5] H01F *1/153*

U.S. Cl. 148—304 **21 Claims**

1. A thin film of an amorphous alloy consisting essentially of

(i) 2 to 95 atom % of at least one element selected from Fe and Co,

(ii) at least 15 atom % to 94 atom % of at least one element selected form Pt and Pd, and

(iii) 2 to 95 atom % of at least one element selected from

(a) 3*d* transition elements other than Fe and Co,

(b) 4*d* transition elements other than Pd,

(c) 5*d* transition elements other than Pt,

(d) La, Ce, Pr, Nd, Pm, Sm, Eu or mixtures thereof,

(e) Group III B elements,

(f) Group IV B elements,

(g) Group V B elements, and

(h) Group VI B elements,

and said film having an easy axis of magnetization perpendicular to its face.

4,995,924

SYNCHRONIZER RING IN SPEED VARIATOR MADE OF COPPER-BASE ALLOY

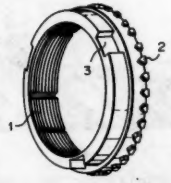
Hidetoshi Akutsu, Kitamoto, Japan, assignor to Mitsubishi Metal Corporation, Tokyo, Japan

Continuation of Ser. No. 170,911, Mar. 21, 1988. This application Oct. 4, 1989, Ser. No. 416,867

Claims priority, application Japan, Mar. 24, 1987, 62-69879; Mar. 24, 1987, 62-69881; Mar. 24, 1987, 62-69882; Mar. 24, 1987, 62-69880; Mar. 25, 1987, 62-70759; Mar. 25, 1987, 62-70757; Mar. 25, 1987, 62-70758; Mar. 26, 1987, 62-72258

Int. Cl.[5] C22C *9/04*

U.S. Cl. 148—433 **17 Claims**



1. A synchronizer ring made of a Cu base alloy for use in a speed variator that exhibits good initial accommodation by a mating surface and which has high wear resistance, said alloy consisting essentially of an a weight percent basis, 20–40% Zn, 2–8% Al, two components which are intermetallic compound forming components selected from the group consisting of (a) 0.1–3% of one or more elements selected from the group consisting of Ti, Zr and Cr, (b) 0.1–3% Sn, (c) 0.1–6% of one or more elements selected from the group consisting of Fe, Ni and Co, (d) 0.1–5% of Mn and (e) 0.2–2% Si, and optionally at

least one additional component that differs from said two components and is selected from the group consisting of (i) 0–3% of one or more elements selected from the group consisting of Ti, Zr and Cr, (ii) 0–3% Sn and (iii) 0–5% Mn, and the balance being Cu and incidental impurities, said ring having either an oxide film layer of aluminum oxide base with an average thickness of 0.1–10 μm or a work-hardened layer with an average thickness of 5–300 μformed on at least the surface of the ring where it is to contact a mating member.

4,995,925

BLASTING COMPOSITION

Björn Engsbriiten, Öbrebro, Sweden, assignor to Nitro Nobel AB, Gyttorp, Sweden

Filed Feb. 22, 1989, Ser. No. 313,471
Claims priority, application Sweden, Feb. 22, 1988, 8800593
Int. Cl.[5] C06B *31/00*
U.S. Cl. 149—2 **14 Claims**

1. A blasting composition of reduced volume strength relative to straight ammonium nitrate/fuel oil (ANFO) compositions, containing particulate oxidizer salt, energy reducing particulate inert and/or density reducing filler and optionally a fuel for modifying the oxygen balance, comprising;

(a) the particulate oxidizing salt;

(b) the energy reducing inert and/or density reducing filler in an amount adapted to give the composition a volume strength relative to standard ANFO between 5 and 80%, the standard ANFO consisting of prilled ammonium nitrate with 5.5 percent by weight of fuel oil and tamped to a charge density of 0.95 g/cc; and

(c) a viscous water-in-oil type emulsion, having a continuous fuel phase and a discontinuous aqueous phase of oxidizing salts, in an amount between 2 and 25% by volume of the total composition bulk volume;

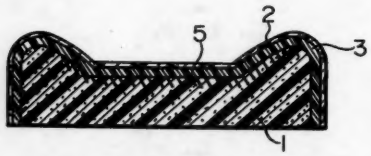
wherein the weight ratio between the emulsion and the particulate oxidizer salt is between 10:90 and 60:40.

4,995,926

METHOD OF MAKING A SEAT

Muneharu Urai, Akishima, Japan, assignor to Tachi-S Co., Ltd., Akishima, Japan

Division of Ser. No. 179,838, Apr. 11, 1988, abandoned. This application Jul. 19, 1989, Ser. No. 383,232
Int. Cl.[5] B32B *31/06, 5/18*
U.S. Cl. 156—78 **2 Claims**



1. A method of forming a seat comprising

(a) setting at rim cover in a molding cavity of a foaming mold;

(b) disposing a film of an adhesive material on an area of the trim cover corresponding to a desired bonded area;

(c) injecting, foaming and molding a polyurethane resin solution onto the trim cover in the mold; and

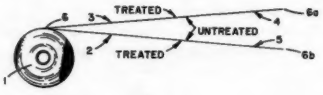
(d) fusing the film of adhesive material by the temperature of the mold so as to be melted into the molded polyurethane and the trim cover thereby forming a bonded area which is permeable to air.

4,995,927

PROCESS FOR AND PRODUCT RELATED TO FABRICATING LINKED DUPLEX FILM WITH TRAPPED PRINTING

Arthur D. Garrett, 7136 N. Chimney Rock Pl., Tucson, Ariz. 85718

Filed Mar. 22, 1988, Ser. No. 171,854
Int. Cl.[5] B32B *31/00*
U.S. Cl. 156—152 **66 Claims**



1. A process of preparing linked duplex film with trapped printing, the process comprising:

obtaining a storage roll of two-ply film with both outside surfaces of the film having been treated for printing or laminating prior to having been wound onto the storage roll;

feeding the two-ply film from the storage roll;

printing on one treated surface; and

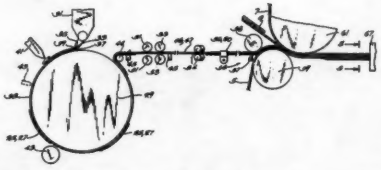
rewinding the two-ply film onto a product roll so that the two treated surfaces come into face-to-face contact.

4,995,928

METHOD AND APPARATUS FOR FORMING AND TRANSPORTING ELASTIC RIBBONS

Reinhardt N. Sabee, 728 S. Summit St., Appleton, Wis. 54911

Filed Oct. 31, 1988, Ser. No. 267,303
Int. Cl.[5] B32B *31/08, 31/30*
U.S. Cl. 156—164 **42 Claims**



9. A method of continuously forming and transporting elastic ribbon to selected processing stations comprising the steps of:

(a) extruding a continuous thin stream of a first material onto the periphery of a roll rotating about an axis, the first material being at least partially drawable when cooled;

(b) intermittently extruding at least one stream of a second material onto the stream of first material, the second material having elastomeric properties when cooled and being self-adhering to the first material;

(c) cooling the first and second extruded materials to develop the cold drawable and elastomeric properties, respectively, of the first and second material, thereby producing a cold drawable carrier strip with the elastic ribbon bonded thereto; and

(d) transporting the carrier strip and elastic ribbon to a processing station.

4,995,929

METHOD OF PROTECTING CONDUITS INCLUDING HELICALLY WINDING A STRIP

Stanley W. O. Menzel, Burnside, Australia, assignor to Rib Loc Australia Pty. Ltd., Australia

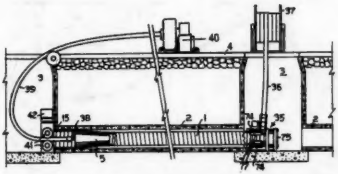
PCT No. PCT/AU87/00069, § 371 Date Nov. 12, 1987, § 102(e) Date Nov. 12, 1987, PCT Pub. No. WO87/05676, PCT Pub. Date Sep. 24, 1987

PCT Filed Mar. 12, 1987, Ser. No. 156,927

Claims priority, application Australia, Mar. 19, 1986, PH05111; Jun. 5, 1986, PH06269; Jun. 10, 1986, PH06322

Int. Cl.[5] B29C *53/78, 63/32*

U.S. Cl. 156—187 11 Claims



1. A method of protecting conduits comprising helically winding a strip at a first location to slidably interconnect edges of the strip to form a tube with the tube and conduit being arranged one within the other, continuing said step of winding to advance one end of the tube along the conduit to a second location and causing the interconnected edges of the strip to slip one on the other to progressively change the diameter of the tube from said second location toward said first location to place the tube closer to the conduit, and said step of causing including continuing said step of winding.

4,995,930

PROCESS FOR THE PRODUCTION OF A FILM COMBINATION

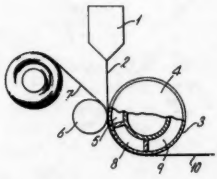
Winfried Merz, Ebermannstadt, and Theo Schmidt, Forchheim, both of Fed. Rep. of Germany, assignors to Lever Brothers Company, New York, N.Y.

Filed Jun. 16, 1986, Ser. No. 874,855

Claims priority, application Fed. Rep. of Germany, Jun. 14, 1985, 3521374

Int. Cl.[5] B32B *31/00*

U.S. Cl. 156—209 1 Claim



1. A process for producing a film combination comprising a web of porous fibrous material having a plastic film bonded thereto, said process comprising extruding a plastic film, feeding the extruded film while it is still in a thermoplastic condition onto a sievelike rotating surface, applying a web of fibrous material against a face of the plastic film that faces away from the sievelike surface as the film is fed onto the rotating surface and applying a pneumatic vacuum to the resulting film web combination through the sievelike rotating surface so that the film is simultaneously perforated and cooled and bonded to the web.

4,995,931

METHOD FOR FORMING COMPONENTS FROM FIBRE-REINFORCED THERMOPLASTIC MATERIALS

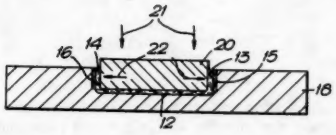
Antony C. Duthie, Semley, England, assignor to Westland Helicopters, Ltd., Yeovil, England

Filed Dec. 19, 1989, Ser. No. 452,409

Claims priority, application United Kingdom, Dec. 22, 1988, 8829993

Int. Cl.[5] B32B *31/20*

U.S. Cl. 156—212 5 Claims



1. A method for forming a component from fiber reinforced thermoplastic materials and including at least one sheet of material to be formed to final shape and at least one reinforcing sheet, comprising the steps of,

pre-consolidating individual sheets of fiber reinforced thermoplastic material each incorporating a co-moulded adherent polymer layer in those areas of the individual sheets that are eventually to be joined together,

locating the reinforcing sheet in a female mould tool part,

locating the sheet to be formed to shape in register with the female mould tool part,

locating a male mould tool part in register with the surface of the sheet of material to be formed to shape opposite to the surface in register with the female mould tool part,

and, with the sheet to be formed to shape at its melt temperature and the mould tool parts at the fusion bonding temperature of the adherent polymer layers, bringing the mould tool parts together to form to shape the said sheet of material to be formed to shape and simultaneously applying pressure to the areas of the sheets incorporating said adherent polymer layers,

maintaining the temperature of the mould tool parts for a predetermined time to ensure fusion bonding of the sheets, cooling the mould tool parts and removing the component.

4,995,932

METHOD FOR PRODUCTION OF PAVING BLOCKS

Kinoto Yoshida, Saitama; Morizumi Fujii, Aichi; Tokihiro Tsuda; Shigeo Suda, both of Saitama; Osamu Kodama; Kazuro Kuroe, both of Saitama; Takumi Tanikawa; Michihiko Nishimura, both of Aichi, and Hideyuki Munakata, Tokyo, all of Japan, assignors to Chichibu Cement Co., Ltd., Tokyo; Inax Corporation, Aichi and ILB Co., Ltd., Tokyo, all of, Japan

PCT No. PCT/JP88/00698, § 371 Date Mar. 14, 1989, § 102(e) Date Mar. 14, 1989, PCT Pub. No. WO89/00625, PCT Pub. Date Jan. 26, 1989

PCT Filed Jul. 13, 1988, Ser. No. 360,922

Claims priority, application Japan, Jul. 14, 1987, 62-175450; Jul. 15, 1987, 62-176623; Jul. 15, 1987, 62-176624

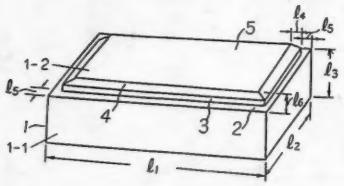
Int. Cl.[5] B29C *29/12*

U.S. Cl. 156—242 16 Claims

1. A method for producing a paving block comprising a block substrate and a solid top layer selected from the group consisting of a tile layer and a cured cement mortar layer bonded to the upper surface of the block substrate having a thickness in the range of 3 cm to 20 cm, with lateral margins of 1 to 8 mm wide in horizontal distance from the peripheral edges of the substrate to the top layer and with vertical distance of 5 to 50 mm from the surface of the top layer to the peripheral edge of the substrate, said method comprising:

applying adhesive cement mortar between the back of the top layer and the upper surface of the substrate,

placing the top layer on the substrate with the above-mentioned margins of the substrate surface, and



applying vibration and/or pressurization between the top layer and the substrate to firmly bond them and form squeeze-out deposits of the adhesive cement mortar around the top layer.

4,995,933

METHOD OF PRODUCING MAT STRIPS FROM WIDE PANELS OF ADHESIVE MATERIAL COVERED WITH RELEASE LAYERS AND APPARATUS FOR IMPLEMENTING THE METHOD

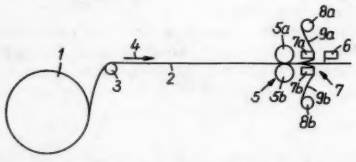
Richard Brüssel, Sulzfeld, Fed. Rep. of Germany, assignor to Krupp Maschinentechnik GmbH, Essen, Fed. Rep. of Germany

Filed Oct. 3, 1989, Ser. No. 431,217

Claims priority, application Fed. Rep. of Germany, Nov. 11, 1988, 3838271

Int. Cl.[5] B32B *31/18*

U.S. Cl. 156—247 **9 Claims**



1. A method of producing strips from an adhesive sheet covered with release layers on opposite sheet faces, comprising the cyclical steps of

(a) holding a leading end of the sheet with gripping members;

(b) longitudinally advancing the held sheet with the gripping members an incremental distance corresponding to the desired length of the strips;

(c) during the advancing step, longitudinally subdividing the sheet into said strips with a longitudinal cutting means;

(d) during the advancing step, removing the release layers from the sheet with a removal device at a location situated upstream of the longitudinal cutting means, as viewed in the direction of the longitudinal sheet advance;

(e) upon completion of the advancing step, immobilizing the sheet by clamping the sheet by a clamping device upstream of the longitudinal cutting means;

(f) transversely severing the strips from the immobilized sheet with a transverse cutting means, whereby a new leading end of the sheet is obtained; the transverse severing step being performed downstream of said location; and

(g) releasing the sheet from the clamping device.

4,995,934

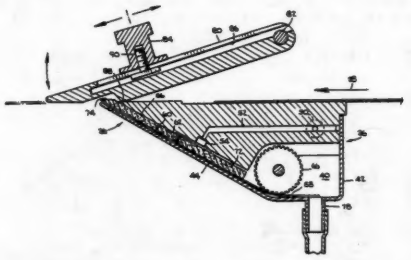
WICKING APPARATUS FOR ENVELOPES

Karel Janatka, Southbury, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Jul. 3, 1989, Ser. No. 374,715

Int. Cl.[5] B43M *5/04, 3/04*

U.S. Cl. 156—441.5 **7 Claims**



1. A wicking apparatus for supplying moisture to a envelope, comprising:

a housing;

a reservoir secured to said housing for storing a supply of water;

a wicking unit secured to said housing, said unit having a lower, inclined surface, an inlet leading to the inside of said units and an interior channel leading from said inlet to said inclined surface;

a wicking material situated on said inclined surface and adjacent said interior channel, said wicking material extending beyond said inclined surface;

means for urging an envelope into contact with said wicking material; and

means for directly applying water under pressure to penetrate said wicking material.

4,995,935

WELDING MACHINE FOR BUTT WELDING OF PLASTIC PROFILES

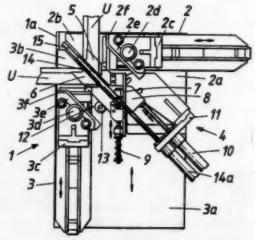
Walter Ganzberger, Ziehbergstrasse 48, A-4053 Haid, Austria

Filed May 4, 1989, Ser. No. 347,497

Claims priority, application Austria, May 4, 1988, 1157/88

Int. Cl.[5] B25B *1/20*; B29C *65/20*

U.S. Cl. 156—499 **6 Claims**



1. A welding machine for butt welding of two pairs of superimposed plastic profiles respectively having an upper surface, a lower surface and surfaces extending in parallel planes to be welded together, comprising

(a) two associated clamping units, one clamping unit being capable of sliding relative to the other clamping unit in a first sliding direction, each clamping unit being designed to accommodate a pair of superimposed plastic profiles inserted therein and including

(1) two external weld boundary blades respectively engaging the upper and lower surfaces of the superimposed plastic profiles, and

(2) an intermediate weld boundary blade movable in a second sliding direction aligned parallel to the surfaces to be welded together, the intermediate weld boundary blade being insertable between the superimposed plastic profiles to be welded together and yielding elastically in the direction extending perpendicularly to the upper and lower surfaces, wherein the intermediate weld boundary blade associated with said one clamping unit is fixed relative to the first sliding direction while the intermediate weld boundary blade associated with the other clamping unit is displaceable in said first sliding direction against the bias of a reset spring,

(b) a bearing block connected to one of the two associated clamping units,

(c) a carrier rail for the displaceable intermediate weld boundary blade, the carrier rail being supported on the bearing block,

(d) a spring support arranged between the bearing block and the carrier rail, the spring support biasing the carrier rail for moving the carrier rail in the direction extending perpendicularly to the upper and lower surfaces,

(e) an entrainment lug mounted on the other one of the two associated clamping units and engaging the displaceble intermediate weld boundary blade, and

(f) a heat reflector insertable between the surfaces to be welded together.

4,995,936

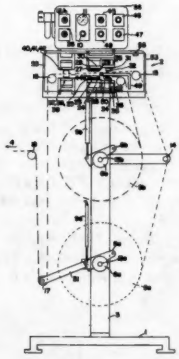
CONTINUOUS WEB SPLICING MACHINE

Robert Cohn, 1210 Jackson St., Omaha, Nebr. 68102

Filed Jul. 27, 1989, Ser. No. 385,686

Int. Cl.[5] B65H *19/14, 19/18, 19/20*

U.S. Cl. 156—504 **12 Claims**



1. A continuous web splicing machine comprising:

a base, and a vertical column extending upright from said base;

a splicing station positioned at a top end of said vertical column and having a splicing station therein for splicing a trailing end of a spent roll of sheet material to a leading end of a fresh roll of sheet material in order to supply a continuous output web of sheet material at an output end thereof;

first and second roll supports on said vertical column positioned one above the other between said base and said top end of said vertical column for rotatably mounting first and second rolls holding first and second webs of sheet material thereon, respectively;

first and second guide means for guiding the first and second webs of sheet material from the first and second rolls, respectively, along first and second paths along one lateral side of said vertical column to the splicing station at said top end of said vertical column;

the splicing station including holding means and cutting means and controls for automatically operating the same; and

output guide means for guiding a continuous web of sheet material from said splicing station,

wherein said holding means of said splicing station includes a first holder for holding a leading end of the web of a fresh one of said two rolls of sheet material in a splicing position, said leading end having an adhesive layer thereon facing toward the web of a spent other one of said two rolls of sheet material, and a second holder which is operable to temporarily hold the web of the spent roll in the splicing position facing opposite the leading end of the web of the fresh roll, said cutting means being operable to cut off a trailing end of the web of the spent roll and adhesively join it to the leading end of the web of the fresh roll, and

wherein said output guide means includes a loop holder for holding a loop of the output web of sufficient length so that the web is continuously output even while the web of the spent roll is temporarily held during the splicing operation, said loop holder including a pivotable arm having a pivot end mounted to said vertical column and a free end pivotably movable along an opposite lateral side of said vertical column from that of said first and second paths of said webs of sheet material.

10. A continuous web slicing machine comprising:

first and second roll supports for rotatably mounting first and second rolls holding first and second webs of sheet material thereon, respectively;

first and second guide means for guiding the first and second webs of sheet material from the first and second rolls, respectively, along first and second paths to a splicing station;

the splicing station including holding means and cutting means positioned along a horizontal splicing path for the webs of sheet material running from an upstream end to a downstream end thereof, for splicing a trailing end of the web of a spent roll of sheet material to a leading end of the web of a fresh roll of sheet material entering from the upstream end in order to supply a continuous output web of sheet material at the output end thereof; and

output guide means for guiding a continuous web of sheet material from said splicing station,

wherein said holding means of said splicing station includes:

(a) first and second upstream holders spaced apart in a vertical direction facing opposite each other and having a central stationary plate extending in parallel with said horizontal splicing path so as to define a first web holding path between said first upstream holder and said stationary plate on one side thereof and a second web holding path between said second upstream holder and said stationary plate on an opposite side thereof, wherein each one of said first and second upstream holders is selectively operable for holding an upstream portion of the web of a fresh roll on the corresponding holding path such that a leading end thereof is held at a splicing position, said leading end having an adhesive layer thereon facing toward the web of the spent roll, and, alternatively, for intermittently holding an upstream portion of the web of a spent roll for a splicing operation;

(b) first and second downstream holders for intermittently holding downstream portions of the webs of the two rolls for a splicing operation; and

(c) first and second pressure members located at a splicing position between said upstream and downstream holders, each of said pressure members having a pressure pad at a downstream part thereof and a knife edge at an upstream part thereof which is aligned with a proximate

end of said stationary plate, said pressure members being spaced apart in the vertical direction facing opposite each other and each being alternately movable to press a trailing end of the web of a spent roll into adhesive contact with the adhesive layer on the leading end of the web of the fresh roll, by the pressure pad thereof being moved into contact with the pressure pad of the other pressure member, and simultaneously to cut the trailing end of the web off from the remainder of the spent roll, by the knife edge thereof moving past the proximate end of the stationary plate.

4,995,937

TAPE APPLYING ARRANGEMENT

Malte Persson, Torup, Sweden, assignor to Forenade Well AB, Torup, Sweden

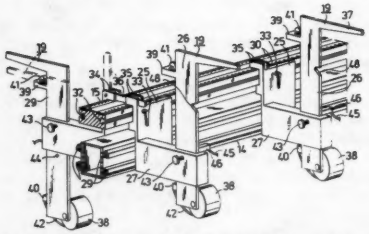
PCT No. PCT/SE87/00568, § 371 Date May 31, 1989, § 102(e) Date May 31, 1989, PCT Pub. No. WO88/04272, PCT Pub. Date Jun. 16, 1988

PCT Filed Nov. 30, 1987, Ser. No. 360,893

Claims priority, application Sweden, Dec. 1, 1986, 860514

Int. Cl.[5] B32B *31/04;* B21F *5/00;* B65C *9/25;* C09J *5/00*

U.S. Cl. 156—543 **31 Claims**



1. An arrangement for applying relatively narrow tapes onto a moving web, in the direction if its length, comprising a plurality of holders for supporting a respective tape store, and further comprising a plurality of tape applicators for guiding a respective tape arriving from a tape store to a location at which the tape is in contact with the web, wherein said holders and tape applicators are carried by and capable of being adjusted positionally along a beam structure which extends transversely to the direction of web movement, and wherein the tape applicators can be adjusted positionally in relation to an applicator-setting beam, which extends transversely to the direction web movement, and can be locked to said beam in selected positions therealong, and wherein the applicator-setting beam is, in turn, carried for movement in its longitudinal direction by a stationary carrier beam which extends parallel therewith.

4,995,938

SUPPORTING DEVICE FOR ULTRASONIC VIBRATION ASSEMBLY

Kiyohide Tsutsumi, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 1, 1989, Ser. No. 387,922

Claims priority, application Japan, Aug. 4, 1988, 63-195226

Int. Cl.[5] B29C *65/08*

U.S. Cl. 156—580.1 **10 Claims**

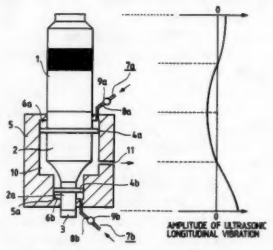
10. A device for supporting an ultrasonic vibration assembly, comprising:

an ultrasonic vibrator having an end portion and extending along an axis;

a vibration transmitter coupled to said end portion of said vibrator coaxially thereto, said vibration transmitter having an outer diameter portion, comprising an outside circumferential surface and two ends, wherein one of said ends of said outer diameter portion of said vibration transmitter has a smaller outer diameter then the other of said ends of said said outer diameter portion of said vibration transmitter;

a tool for ultrasonic machining connected to said end of said smaller outer diameter portion of said vibration transmitter;

two flanges provided integrally on said outside circumferential surface of said transmitter so as to act as pistons; an outer diameter of one of said flanges near said tool being smaller then the outer diameter of the other of said flanges;



a cylinder, having a sidewall portion and two opposite end portions defining an interior, said flanges being fitted in said cylinder so as to be moveable in the axial direction of said cylinder, said cylinder having an opening at the center of said sidewall portion thereof and having a small inner diameter portion in said interior of said cylinder near said tool, said smaller of said flanges being fitted in said small inner diameter portion; and

mechanisms for feeding a pressurized fluid to two spaces defined between said flanges and both ends of said cylinder, said mechanism including feed pipes and control valves.

4,995,939

METHOD AND APPARATUS FOR DETERMINING THE LAYER THICKNESS OF SEMICONDUCTOR LAYER STRUCTURES

György Ferenczi; Katalin Erdélyi; Mária Somogyi; János Boda, all of Budapest; György Füle, Pecel, and Gábor Aszódi, Budapest, all of Hungary, assignors to Magyar Tudomanyos Akademia Muszaki Fizikai Kutato Intezete, Hungary

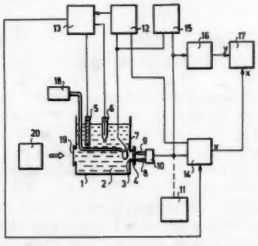
PCT No. PCT/HU88/00030, § 371 Date Feb. 8, 1989, § 102(e) Date Feb. 8, 1989, PCT Pub. No. WO88/09053, PCT Pub. Date Nov. 17, 1988

PCT Filed May 4, 1988, Ser. No. 301,889

Claims priority, application Hungary, May 4, 1987, 1989/87

Int. Cl.[5] G01N *27/46*

U.S. Cl. 156—627 **13 Claims**



1. A method for determining the layer thickness of semiconductor layer structures, in which a multilayer semiconductor sample is examined, comprising the steps of contacting a surface of said sample with an electrolyte, anodically etching said

surface using an etching current, determining, during the etching process, the actual etching depth, by integrating said etching current, said sample being excited by a periodic electrical signal while said sample is being etched and measuring a response to said periodic signal in a manner such that at the frequency of the exciting signal a real component, comprising the conductance of the admittance, of the sample is measured, wherein the extreme values of said component are examined and the etching depth data associated with said extreme values are recorded, said extreme values defining the transitions of the examined layers of the sample.

4,995,940

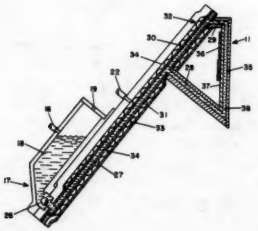
METHOD FOR FORMING A GAS REMOVING DEVICE FOR AN INK JET SYSTEM

Nathan P. Hine, East Thetford, Vt., and Robert L. Wells, Jr., Hanover, N.H., assignors to Spectra, Inc., Hanover, N.H.

Division of Ser. No. 273,883, Nov. 18, 1988, Pat. No. 4,940,995. This application May 1, 1990, Ser. No. 517,357

Int. Cl.[5] B44C *1/22;* **B29C** *37/00;* **C03C** *15/00, 25/06*

U.S. Cl. 156—629 **7 Claims**



1. A method for preparing a dissolved-gas removing device for an ink jet system comprising etching a surface of a fluorine-containing membrane, and bonding the etched surface to a support member to provide a wall of an ink-containing element in an ink jet system.

4,995,941

METHOD OF MANUFACTURE INTERCONNECT DEVICE

Gregory H. Nelson, Gilbert, Ariz.; Sanford Lebow, Westlake Village, Calif., and Eugene Nogavich, Gilbert, Ariz., assignors to Rogers Corporation, Rogers, Conn.

Filed May 15, 1989, Ser. No. 352,112

Int. Cl.[5] B44C *1/22;* **C23F** *1/02;* **B29C** *37/00;* **C03C** *15/00*

U.S. Cl. 156—630 **19 Claims**

1. A method of making an interconnect drive for electronic components comprising the steps of:

forming a release layer on a carrier plate;

forming a conductive pattern of leads on said release layer;

forming registration features on said release layer;

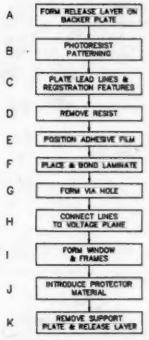
bonding a laminate to said conductive pattern of leads by a layer of adhesive, said laminate including a conductive sheet and a dielectric sheet wherein said dielectric sheet faces said conductive pattern of leads and said conductive sheet faces away from said adhesive layer;

forming via holes in said laminate in a predetermined pattern, said via holes extending through said conductive sheet, dielectric sheet and adhesive layer to expose said leads;

depositing conductive material in said via holes and onto said conductive sheet of said laminate to interconnect said leads to said conductive sheet;

forming at least one window in said device by removing selected parts of said conductive material, said laminate and said adhesive layer, said window extending through said dielectric sheet and adhesive layer to expose said leads; and

forming at least one frame spaced from and surrounding said window in said device by removing selected parts of said conductive material, said laminate and said adhesive layer,



said frame extending through said dielectric sheet and adhesive layer to expose said leads.

4,995,942

EFFECTIVE NEAR NEUTRAL PH ETCHING SOLUTION FOR MOLYBDENUM OR TUNGSTEN

Lawrence D. David, Wappingers Falls, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 30, 1990, Ser. No. 516,845

Int. Cl.[5] B44C *1/22;* **C23F** *1/00;* **C09K** *13/00*

U.S. Cl. 156—642 **21 Claims**

11. A method of effectively etching molybdenum or tungsten from a composite material comprising molydenum or tungsten adhered to a base-sensitive material without damaging the material comprising the steps of:

contacting the composite with a neutral or near neutral pH etching solution comprising:

an aqueous ferricyanide ion solution, a soluble molybdate or tungstate, and an essential compound such that upon combination of said soluble molybdate or tungstate and said essential compound, a heteropoly compound is formed in which said compound ingredient contributes at least one heteroatom to said heteropolycompound.

21. The method of claim **11** further comprising the step of introducing ozone into said etching solution to rejuvenate said solution.

4,995,943

PRETREATMENT OF CELLULOSIC MATERIAL WITH CARBON DIOXIDE

Karl H. Rehberg, P.O. Drawer 2868, Lakeland, Fla. 33806

Continuation-in-part of Ser. No. 814,144, Dec. 27, 1985, abandoned. This application Aug. 4, 1988, Ser. No. 228,142

Int. Cl.[5] D21C *1/00, 1/04*

U.S. Cl. 162—63 **1 Claim**

1. A method of pretreating cellulosic material for subsequent conversion by chemical treatment, comprising the steps of confining the material in an anhydrous environment comprising carbon dioxide in at least major part, and subjecting the material to one or more successive pressure cycles, including

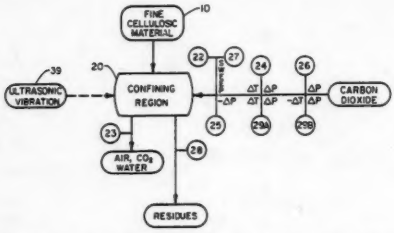
compressing the confined material in said anhydrous environment to superatmospheric pressure and maintaining it at such pressure for a period of minutes, and

then decompressing the compressed material in said anhydrous environment for a further period of minutes, and

then returning it to atmospheric pressure, wherein

the material is compressed in an atmosphere consisting essentially of carbon dioxide to a pressure of about several

atmospheres at a temperature of about 25° C. to 35° C. for at least about a dozen minutes, and



then is decompressed to a pressure of a minor fraction of an atmosphere for at least about a half dozen minutes.

4,995,944

CONTROLLING DEPOSITS ON PAPER MACHINE FELTS USING CATIONIC POLYMER AND CATIONIC SURFACTANT MIXTURE

David A. Aston, and Stewart N. Paul, both of Ontario, Canada, assignors to Dearborn Chemical Company Ltd., Mississauga, Canada

Continuation of Ser. No. 323,597, Mar. 14, 1989, abandoned, which is a continuation-in-part of Ser. No. 245,852, Sep. 16, 1988, abandoned. This application Aug. 9, 1990, Ser. No. 564,658

Int. Cl.[5] D21F *1/32;* D21H *21/02*

U.S. Cl. 162—199 **30 Claims**

1. A method of inhibiting the deposit of sticky material on a papermill felt used in processing pulp slurry into sheets, comprising the step of:

applying to said papermill felt an aqueous solution which is substantially free of anionic macromolecules and which contains at least about 2 ppm of a cationic polymer having a molecular weight between about 2,000 and 300,000; and which contains a water soluble cationic surfactant, said surfactant having a molecular weight between about 200 and 800, applied in an amount effective to inhibit the buildup of deposits derived from the cationic polymer and wherein the weight ratio of surfactant to polymer is between about 50:1 to 1:1.

4,995,945

COUNTER-CURRENT GAS-LIQUID CONTACTING DEVICE

Andrew J. M. Craig, Yenda, Australia, assignor to Flavourtech Pty. Ltd., Griffith, Australia

Continuation of Ser. No. 828,381, Feb. 11, 1986, abandoned. This application Mar. 8, 1988, Ser. No. 165,579

Claims priority, application Australia, Feb. 11, 1985, PG9216

Int. Cl.[5] B01D *1/22, 19/00*

U.S. Cl. 202—177 **15 Claims**

1. A counter-current contacting device comprising:

a housing having a vertical longitudinal axis:

a rotatable shaft at least partially disposed within said housing, so as to extend longitudinally thereof, and which is vertically adjustable relative to said housing;

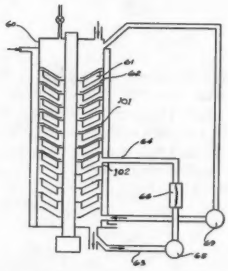
at least one inverted cone mounted on said shaft within said housing and having at least one fin extending outwardly from said shaft and mounted along said cone and extending downwardly from said cone to provide a fin distal border;

said housing having a first lower frustoconical surface over which liquid can pass and extending inwardly from the inner wall thereof and disposed so as to be approximately adjacent to said distal border and adjustable relative thereto by said relative adjustment to provide a selectable gap,

a motor coupled to said shaft to rotate said shaft;

said housing having coupled operatively therewith means to recirculate liquid passing through the device from at least one liquid outlet associated with said housing to approximately above said first lower frustoconical surface through at least one liquid inlet into said housing, said means to recirculate liquid including means to heat said liquid prior to its reintroduction into said housing;

a second lower frustoconical surface below said first lower frustoconical surface and at least two upper frustoconical



surfaces above said liquid inlet and wherein the spacing between said lower frustoconical surfaces is greater than the spacing between said upper frustoconical surfaces above said liquid inlet to provide for an increased flow volume of a liquid across said lower frustoconical surfaces as compared with the flow volume of liquid across said upper frustoconical surfaces to ameliorate flooding in said device as a result of liquid recirculating into said device by said means to recirculate liquid.

4,995,946

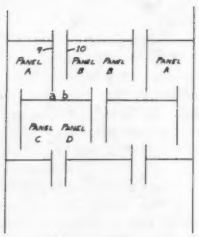
METHOD AND APPARATUS FOR ACHIEVING BALANCED FLOW ON MULTIPASS DISTILLATION TRAYS

Robert G. Auger, Monroeville Borough, Pa., assignor to Aristech Chemical Corporation, Pittsburgh, Pa.

Filed Oct. 10, 1989, Ser. No. 419,557

Int. Cl.[5] B01D *3/26;* B01F *3/04*

U.S. Cl. 203—99 **2 Claims**



1. Method of constructing a multipass distillation tower having downcomer baffles comprising designing a horizontal set of panels of at least one tray therein with tray areas and gas throughput capacity on each side of each downcomer baffle in predetermined ratios whereby at least weir heights, downcomer clearances, range of viscosities, flow rates, foaming characteristics of a fluid, and volatilities are taken into account, and adjusting only the clearances under the downcomer baffles until the ratio of the flow of liquid to the flow of vapor (L/V) on a horizontal level, or tray is equilibrated.

4,995,947

PROCESS FOR FORMING A METAL COMPOUND COATING ON A SUBSTRATE

Donald J. Sharp; Milton E. Vernon, and Steven A. Wright, all of Albuquerque, N. Mex., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Jun. 29, 1988, Ser. No. 213,012
Int. Cl.[5] C25D *15/00*; C22B *60/02*
U.S. Cl. 204—1.5 28 Claims

1. A method of forming a layer of a metal compound on a substrate, wherein said compound is selected from the group consisting of the compounds of uranium, thorium, and plutonium, said method comprising the steps of:

(a) providing an aqueous dispersion of sub-micron-sized particles of a precursor of said metal compound and an electrophoretically active organic colloid within an electrolytic cell containing at least two electrodes;

(b) providing said substrate as an electrode in said cell, said electrode comprising a cathode and an anode;

(c) imposing an electric potential between said cathode and said anode, whereby a layer comprising a mixture of the precursor particles and said organic colloid is deposited on said anode of said substrate;

(d) removing the resulting coated substrate from said electrolytic cell;

(e) drying said coated substrate in air; and

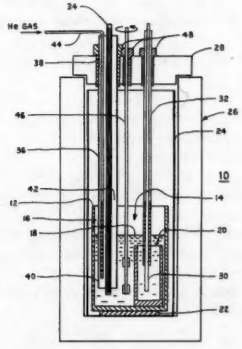
(f) heat-treating said coated substrate at a temperature at which said organic colloid cross-links to form a rigid coating and subsequently pyrolyzes to form carbon.

4,995,948

APPARATUS AND PROCESS FOR THE ELECTROLYTIC REDUCTION OF URANIUM AND PLUTONIUM OXIDES

David S. Poa; Leslie Burris; Robert K. Steunenberg, all of Naperville, and Zygmunt Tomczuk, Orland Park, all of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 24, 1989, Ser. No. 384,195
Int. Cl.[5] C25C *3/00, 3/08, 3/22*
U.S. Cl. 204—1.5 11 Claims



7. A process for electrolytically reducing metal oxides selected from the group consisting of uranium and plutonium to high-purity solid metal comprising:

providing an electrolytic cell having a first container, a relatively smaller second container within the first container, an electrolyte in the cell filling both containers, the level of the electrolyte in the first container being above the top of the second container, an anode in the electrolyte in the first container, means in the electrolyte for passing a sparging gas over the anode, a cathode in the electrolyte in the second container, stirring means in the first container for stirring and mixing the electrolyte and for circulating the electrolyte between the two chambers,

heating the electrolyte to a temperature between 900 degrees C and the melting temperature of the metal to be produced,

adding the metal oxide to the heated electrolyte in the first chamber,

electrolytically reducing the metal oxide to metal while stirring and mixing the electrolyte in the first container and circulating the electrolyte containing the dissolved oxides between the chambers, whereby high-purity metal forms as a solid on the cathode within the second chamber.

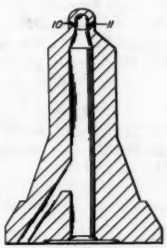
8. The method of claim 7 wherein the electrolyte consists of one or more members selected from the group consisting of LiF, KF, NaF, CaF_2, BaF_2, and MgF_2, and also contains UF_4.

4,995,949

ORIFICE SIZING USING CHEMICAL, ELECTROCHEMICAL, ELECTRICAL DISCHARGE MACHINING, PLATING, COATING TECHNIQUES

Lawrence J. Rhoades, Pittsburg, Pa., assignor to Extrude Hone Corporation, Irwin, Pa.

Continuation-in-part of Ser. No. 842,285, Mar. 21, 1986, abandoned. This application Nov. 2, 1988, Ser. No. 265,934
Int. Cl.[5] B23H *3/00, 9/14*; C25D *5/02*
U.S. Cl. 204—15 13 Claims



1. The method of attaining a specific flow resistance of a fluid through an orifice in a structure by processing said orifice with a process utilizing a processing fluid, said process selected from the group consisting of chemical machining, electrochemical machining, electrical discharge machining, electroplating, electroless plating and vapor deposition, wherein said processing fluid is caused to flow through said orifice by a mechanical pump, said method comprising:

A. Determining a target flow resistance of said processing fluid at a constant applied pressure as will provide said specific flow resistance of said fluid;

B. Pumping said processing fluid through said orifice with said mechanical pump to process said orifice while maintaining said constant applied pressure with said mechanical pump;

C. Measuring the dynamic flow resistance of said processing fluid through said orifice while said processing fluid is being pumped therethrough, and permitting the volumetric flow rate of said processing fluid to change in direct proportion to the processing effected on said orifice for the purpose of maintaining said constant applied pressure with said pump; and

D. Stopping the processing of said orifice when said dynamic flow resistance is equal to said target flow resistance.

4,995,950

PREPARATION OF ALKALI METAL NITRATES

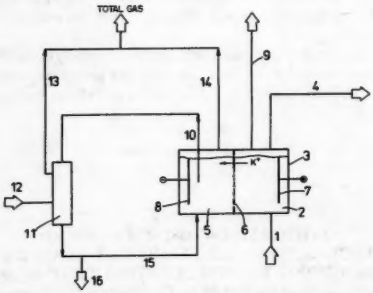
Wolfgang Kochanek, Weisenheim, and Bernd Leutner, Frankenthal, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 25, 1988, Ser. No. 236,446

Claims priority, application Fed. Rep. of Germany, Sep. 4, 1987, 3729669

Int. Cl.[5] C25B *1/14*

U.S. Cl. 204—91 5 Claims



1. A process for preparing an alkali metal nitrate by electrolysis of an alkali metal chloride solution supplied to the anode space of an electrolysis cell, separated from the cathode space by a perm-selective cation exchange membrane, with nitric acid being supplied to the cathode space, which comprises supplying the cathode space with a nitric acid/alkali metal nitrate solution whose alkali metal nitrate concentration is not less than 25% by weight and whose HNO_3 concentration is of from 0.1 to 10% by weight and withdrawing from the cathode space a solution whose pH does not exceed 5.

4,995,951

BRIGHTENING METHOD

Peter Venn, Wuppertal, Fed. Rep. of Germany, assignor to Gebr. Happich GmbH, Fed. Rep. of Germany

Filed May 23, 1990, Ser. No. 528,058

Claims priority, application Fed. Rep. of Germany, May 26, 1989, 3917184

Int. Cl.[5] C25F *3/20*

U.S. Cl. 204—129.95 10 Claims

1. A method for brightening aluminum or aluminum alloy parts, comprising treating said parts in an alkaline electrolyte, subjected to direct current, said alkaline electrolyte comprising trisodium phosphate, disodium carbonate, aluminum phosphate, and beechwood extracts.

4,995,952

ELECTROLYSIS OF WATER USING HYDROGEN SULFIDE

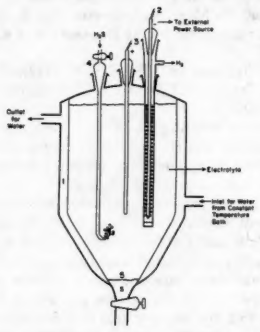
Balasubramanian Dandapani, 2808-700 Dominik Dr., and John O'M. Bockris, Rt. 3, Box 286, both of College Station, Tex. 77840

Filed Apr. 30, 1987, Ser. No. 44,068

Int. Cl.[5] C25B *1/04*

U.S. Cl. 204—129 5 Claims

1. An electrolytic process, comprising electrolyzing hydrogen sulfide in an aqueous alkaline solution at a temperature above about 65° C., the solution having an alkali concentration of between about 1M and about 6M, the solution being substantially free of organic solvents, the electrolysis being performed by contacting the solution with an anode and a cathode and connecting the anode and the cathode to an external power source; whereby substantially pure hydrogen gas is generated continuously at the cathode; whereby sulfur is generated continuously at the anode without substantially passivating the anode, the sulfur being spontaneously dissolved in the solution as polysulfide and ultimately precipitating in the form of substantially pure sulfur; and whereby substantially no gaseous oxygen is generated at the anode.



4,995,953

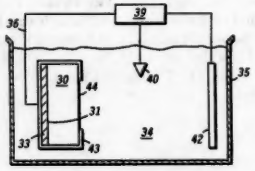
METHOD OF FORMING A SEMICONDUCTOR MEMBRANE USING AN ELECTROCHEMICAL ETCH-STOP

Renwin J. Yee, Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 30, 1989, Ser. No. 428,580

Int. Cl.[5] C25F *3/12, 3/14*

U.S. Cl. 204—129.3 18 Claims



1. A method of forming a membrane, comprising the steps of:

providing a semiconductor substrate of a first conductivity type, having a first and a second surface;

providing a conductive layer on said first surface of said semiconductor substrate;

applying a voltage to said conductive layer, thus creating a depletion region which extends from said first surface into said semiconductor substrate; and

etching a portion of said second surface of said semiconductor substrate with an electrochemical, anisotropic etch solution, wherein etching terminates at said depletion region, thus forming said membrane having a thickness defined by said depletion region.

4,995,954

POROUS SILICONFORMATION AND ETCHING PROCESS FOR USE IN SILICON MICROMACHINING

Terry R. Guilinger; Michael J. Kelly; Samuel B. Martin, Jr.; Joel O. Stevenson, and Sylvia S. Tsao, all of Albuquerque, N. Mex., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Feb. 12, 1990, Ser. No. 478,376

Int. Cl.[5] C25F *3/12*

U.S. Cl. 204—129.75 8 Claims

1. A reproducible process for uniformly etching silicon from

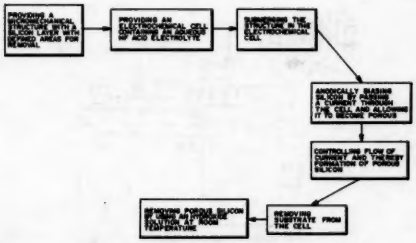
a series of micromechanical structures used in electrical devices comprising the steps of

(a) providing a micromechanical structure having a silicon layer with defined areas for removal thereon;

(b) providing an electrochemical cell containing an aqueous hydrofluoric acid electrolyte;

(c) submerging said micromechanical structure in said electrochemical cell;

(d) anodically biasing said defined areas of said silicon layer by passing a current through said electrochemical cell for a time period sufficient to cause said defined areas of said silicon layer to become porous;



(e) regulating the depth of formation of said porous silicon by controlling the total charge passed through said electrochemical cell;

(f) removing said micromechanical structure from said electrochemical cell and then submerging said micromechanical structure in a hydroxide solution to remove said porous silicon; and

(g) subsequently repeating the process for each of said series of micromechanical structures to achieve a reproducibility better than ±0.3%.

4,995,955

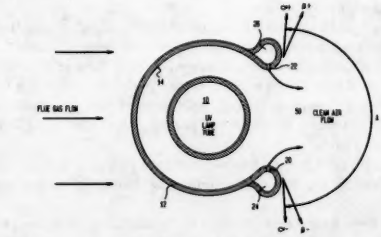
OPTICALLY-ASSISTED GAS DECONTAMINATION PROCESS

Yong W. Kim, Bethlehem, and William A. Frederick, Allentown, both of Pa., assignors to Lehigh University, Bethlehem, Pa.

Continuation of Ser. No. 407,689, Sep. 14, 1989, abandoned, which is a continuation of Ser. No. 107,867, Oct. 8, 1987, abandoned, which is a continuation of Ser. No. 775,449, Sep. 12, 1985, abandoned. This application Apr. 26, 1990, Ser. No. 517,408

Int. Cl.[5] B01D *53/32;* **C01B** *17/00, 21/00*

U.S. Cl. 204—157.3 **11 Claims**



1. A process for the removal of sulfur and nitrogen oxides from gas mixtures containing those compounds, together with oxygen and water, comprising the steps of:

exposing said gas mixture to an ultraviolet light source having a wavelength of below 200 nanometers with sufficient intensity to dissociate molecular oxygen into ground state atomic oxygen;

permitting said ground state atomic oxygen to oxidize said sulfur and nitrogen oxides;

permitting said oxidized sulfur and nitrogen oxides to react with water and thereby forming hydrated reaction products;

removing said hydrated reaction products directly from said gas mixture;

all of said steps being conducted in the absence of ammonia.

4,995,956

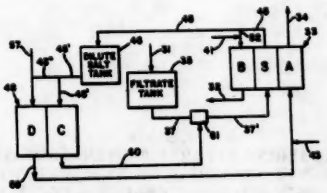
METHOD AND APPARATUS TO CONTROL A SALT STREAM TO BE TREATED IN AN ELECTRODIALYTIC WATER SPLITTER

Krishnamurthy N. Mani, Basking Ridge, N.J., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Apr. 6, 1989, Ser. No. 335,171

Int. Cl.[5] B01D *13/02*

U.S. Cl. 204—182.4 **21 Claims**



21. A method of converting salt in a raw stream to acid and base in a water splitter comprising a salt compartment, an acid compartment, and a base compartment comprising:

feeding the salt feed stream to the salt compartment of the water splitter;

withdrawing a dilute salt stream from the salt compartment;

withdrawing an acid stream from the acid compartment;

withdrawing a base stream from the base compartment;

feeding the dilute salt stream to an electrodialysis unit having a diluting compartment and a concentration compartment, at least part of the dilute salt solution being fed to the concentration compartment;

withdrawing an electrodialysis product stream from the concentration compartment; and

controlling the pH of the salt feed stream by combining the salt feed stream with a stream selected from the group consisting of the acid stream, the base stream, and the dilute salt stream.

4,995,957

DEVICE AND METHOD FOR THE ELECTROPHORETIC SEPARATION OF MACROMOLECULES

Andreas Ziegler, Steinweg 37, 3550 Marburg, and Karl-Heinz Geiger, Weissdornweg 13, 7400 Türbingen, both of Fed. Rep. of Germany

Filed May 9, 1988, Ser. No. 191,689

Claims priority, application Fed. Rep. of Germany, May 7, 1987, 3715170

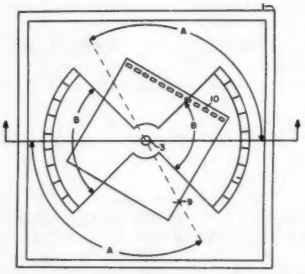
Int. Cl.[5] G01N *27/26;* **B01D** *57/62*

U.S. Cl. 204—182.8 **19 Claims**

1. Electrophoretic separation apparatus suitable for the separation of macromolecules, comprising:

electrode means for generating an electric field for acting on at least one specimen;

electrode carrier means for holding said electrode means; and



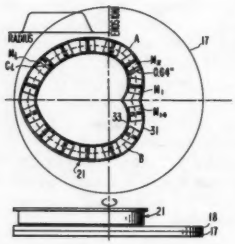
rotating driving means for rotating said carrier means and said electrode means with respect to the at least one specimen.

4,995,958

SPUTTERING APPARATUS WITH A ROTATING MAGNET ARRAY HAVING A GEOMETRY FOR SPECIFIED TARGET EROSION PROFILE

Robert L. Anderson, and John C. Helmer, both of Palo Alto, Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed May 22, 1989, Ser. No. 355,713
Int. Cl.[5] C23C *14/35*
U.S. Cl. 204—298.200 9 Claims



1. A magnetron sputter apparatus comprising:
a vacuum chamber;
means for holding a target having a front surface in said vacuum chamber; and
rotatable magnetic means for generating a moveable magnetic field over said front surface of said target,
said magnetic means being configured so that at least a first portion of the normalized centerline of said magnetic means is describable by an equation of the form

$$\theta = \int_1^r \frac{\sqrt{(\xi^2(u)u^2 - 1}}{u} du + C$$

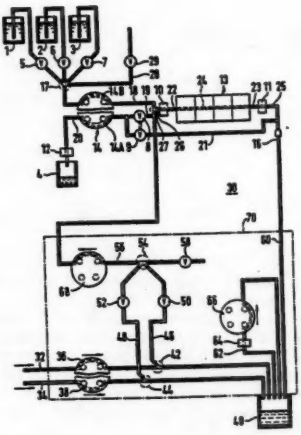
where $\xi(u)$ is a preselected normalized erosion profile to be generated in said target during rotation of said magnetic means, C is a selected constant, and θ has a selected range.

4,995,959

MEASURING APPARATUS FOR DETERMINATION OF THE ACTIVITY OR OF THE CONCENTRATION OF IONS IN SOLUTIONS

Klaus Metzner, Friedrichsdorf, Fed. Rep. of Germany, assignor to Fresenius, AG, Bad Homburg, Fed. Rep. of Germany

Filed Sep. 20, 1989, Ser. No. 410,123
Claims priority, application Fed. Rep. of Germany, Sep. 24, 1988, 3832528
Int. Cl.[5] G01N *27/27*
U.S. Cl. 204—411 8 Claims



1. In a measuring device for determination of the activity or the concentration of ions in solution comprising;
a flow channel having a reference electrode and at least one measuring electrode, said flow channel having a first end and a second end;
a first line connecting said first end of said flow channel to at least one calibrating liquid container through first valve means;
first pumping means interpose din said first line between said first valve means and said first end of said flow channel
a discharge line connected to said first line adjacent said first end of said flow channel, said discharge line having second pumping means;
a sample feed line connected to said second end of said flow channel for providing a sample to said flow channel
first and second sensors arranged in said first and second ends of said flow channel, respectively, for detecting the flowing fronts of liquids, said sensors being capable of discriminating between the presence and absence of liquids; and
control means coupled to said sensors, pumping means, and valve means for controlling said pumping means and valve means;
the improvement comprising a connection line branching off from said exit line of said second pump, said connection line exiting into said flow channel in the vicinity of said second end, said connecting line, being provided with a first valve and in said exit line, between the juncture of said lines and at mixing point and the point of connection of connection line to said exit line, a second valve is provided.

4,995,960
ELECTROCHEMICAL ELECTRODES

Martin C. Wiles; David J. Schiffrin, both of Southampton, and David J. Clarke, Salisbury, all of Great Britain, assignors to Public Health Laboratory Service Board, England

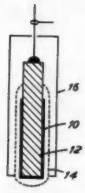
PCT No. PCT/GB88/00992, § 371 Date Sep. 25, 1989, § 102(e) Date Sep. 25, 1989, PCT Pub. No. WO89/04958, PCT Pub. Date Jun. 1, 1989

PCT Filed Nov. 14, 1988, Ser. No. 381,665

Claims priority, application United Kingdom, Nov. 24, 1987, 8727497

Int. Cl.[5] G01N *27/30, 27/333*

U.S. Cl. 204—418 **17 Claims**



1. An electrochemical reference element in combination with an organic liquid, comprising a metal electrode and a solid electrolyte in contact with the electrode, the electrolyte comprising a salt of an organic anion with a metal cation of the electrode, the salt being substantially insoluble in said organic liquid and the anion being soluble in said organic liquid to form a solution maintaining reversible equilibrium between the anion in the electrolyte and the anion in solution in the organic liquid.

3. An electrochemical reference element comprising a metal conductor coated with a tetraphenyl borate salt of said metal.

6. An ion selective electrode comprising an electrochemical reference element according to claim 3 with an ion selective membrane containing tetraphenyl borate ion and establishing direct contact with said coating.

15. An ion selective electrode comprising a metal electrode, a solid electrolyte coating on the metal electrode, the electrolyte comprising a salt of an organic anion with the metal cation of the electrode and an ion selective membrane in direct contact with the solid electrolyte coating, the membrane including said organic anion.

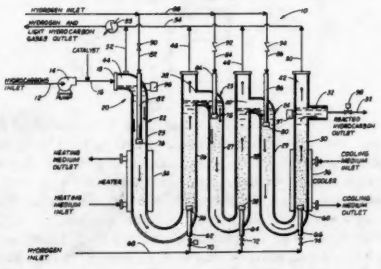
4,995,961
PROCESS AND APPARATUS FOR HYDROGENATING HYDROCARBONS

George E. Hays, Bartlesville, Okla., and Theodore M. Classen, Liberty, Mo., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 19, 1988, Ser. No. 234,316

Int. Cl.[5] C10G *47/02*

U.S. Cl. 208—108 **14 Claims**



1. A process of hydrogenating a stream of hydrocarbons at elevated pressure and temperature comprising the successive steps of:

passing said stream of hydrocarbons into two or more serially connected hydrogenation reaction zones, each zone providing a downward or an upward path and said two or more zone being connected whereby said stream is caused to flow along successive downward and upward paths therein;

dispersing hydrogen in said stream of hydrocarbons as said stream passes through said reaction zones so that said hydrocarbons are hydrogenated; and the

cooling the resulting hydrogenated stream of hydrocarbons.

4,995,962
WAX HYDROISOMERIZATION PROCESS

Thomas F. Degnan, Jr., Morristown, and Michael E. Landis, Woodbury, both of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Filed Dec. 29, 1989, Ser. No. 459,154

Int. Cl.[5] C10G *47/20*

U.S. Cl. 208—110 **6 Claims**

1. A process for hydroisomerizing petroleum wax or synthetic paraffin wax, thereby reducing its pour point, said process comprising contacting said wax with a hydroisomerization catalyst under sufficient hydroisomerization conditions, said catalyst comprising a layered titanate containing interspathic polymeric oxide, said catalyst further comprising a hydrogenating component selected from the group consisting of Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, and Pt.

4,995,963
CRYSTALLINE GALLIOSILICATE WITH THE ZEOLITE L TYPE STRUCTURE AND ITS USE IN CHEMICAL CATALYTIC CONVERSIONS

Mario L. Occelli, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 274,621, Nov. 22, 1988, Pat. No. 4,919,907, which is a continuation-in-part of Ser. No. 945,092, Dec. 22, 1986, abandoned. This application Jan. 16, 1990, Ser. No. 466,006

Int. Cl.[5] C10G *11/05;* **C07C** *1/04, 2/12, 4/06*

U.S. Cl. 208—111 **24 Claims**

1. A process for the acid catalyzed chemical conversion of a feedstock containing organic compounds into reaction products which process comprises contacting said feedstock under acid catalyzed conversion conditions with a catalyst comprising a catalytically active, galliosilicate molecular sieve, wherein said molecular sieve (1) comprises silicon, gallium and oxygen, (2) has an X-ray powder diffraction pattern characteristic of the zeolite L structure and (3) contains less than about 0.20 weight percent alumina.

4,995,964
MIDBARREL HYDROCRACKING PROCESS EMPLOYING RARE EARTH PILLARED CLAYS

Frank P. Gortsema, Pleasantville, N.Y.; John R. McCauley, Louisville, Md.; Regis J. Pellet, Croton on Hudson, N.Y.; James G. Miller, Pearl River, N.Y., and Jule A. Rabo, Armonk, N.Y., assignors to UOP, Des Plaines, Ill.

Continuation-in-part of Ser. No. 21,972, Mar. 5, 1987. This application Feb. 26, 1988, Ser. No. 154,834

The portion of the term of this patent subsequent to Dec. 25, 2007, has been disclaimed.

Int. Cl.[5] C10G *47/00, 47/12*

U.S. Cl. 208—112 **69 Claims**

1. In a process for hydrocracking hydrocarbons boiling above about 700° F. to midbarrel fuel products boiling between about 300° F. and about 700° F. which includes contacting said hydrocarbons with hydrogen under effective hydrocracking conditions in the presence of a catalyst composition comprising at least one hydrogenation component and at least one

cracking component, the improvement which comprises utilizing as said cracking component an expanded clay including pillars comprising (a) at least one pillaring metal, (b) at least one rare earth element and (c) oxygen located between the sheets of at least one clay mineral or synthetic analogue thereof.

4,995,965

CALCIUM CARBONATE BENEFICIATION

Joseph L. Mehaffey, Lockport, and Thomas C. Newman, Hinsdale, both of Ill., assignors to Akzo America Inc., New York, N.Y.

Division of Ser. No. 206,247, Jun. 13, 1988, Pat. No. 4,892,646. This application Oct. 25, 1989, Ser. No. 427,154

Int. Cl.[5] B03D *1/01, 1/02*

U.S. Cl. 209—166 2 Claims

1. A process for purifying calcium carbonate ore containing silicate impurities comprising grinding and forming an aqueous slurry of said ore, adding an effective amount of a collector selective for said silicate impurities to said slurry comprising methyl-bis(2-hydroxypropyl)cocoammonium methyl sulfate, and subjecting said slurry containing said silicate impurity collector to froth flotation thereby floating the silicate impurities away from a resultant slurry containing purified calcium carbonate.

4,995,966

SIFTER-SCREENING MACHINE FOR BULK MATERIAL

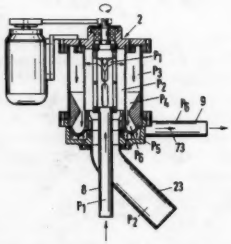
Maximilian Ofner, Leonberg, Fed. Rep. of Germany, assignor to Firma IBV, Leonberg, Fed. Rep. of Germany

Filed Nov. 3, 1989, Ser. No. 431,602

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1988, 3837346

Int. Cl.[5] B07B *1/00*

U.S. Cl. 209—240 15 Claims



1. In a sifter-screening machine for loose material, including inlet means for said material, downstream thereof a screen through which said material is conveyed along a conveying route via an air stream, and downstream thereof an outlet means for screened material, the improvement wherein:

disposed in the conveying route of said material, downstream of said screen, is a zone of reduced static pressure followed in the conveying direction by a conveying zone having an increasing cross-sectional configuration;

disposed downstream of said conveying zone is an air-permeable means for supplying said material to said outlet means with a supply of compressed air being delivered below said air-permeable means; and

the weight of said material just upstream of said outlet means is at least nearly equal to the oppositely directed pressure of said compressed air below said air-permeable supply means.

4,995,967

SEPARATOR FOR CELL-CONTAINING LIQUIDS

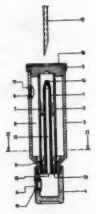
Petrus J. D. M. van Driessche, St. Jansteen, Netherlands, assignor to Akzo N.V., Netherlands

Filed Oct. 24, 1988, Ser. No. 261,326

Claims priority, application Netherlands, Nov. 6, 1987, 8702652

Int. Cl.[5] B01D *69/08*

U.S. Cl. 210—94 5 Claims



1. A device for separating a cellcontaining liquid into a cell-containing fraction and a cell-free fraction, which device comprises an essentially elongated housing at one end of which there is provided a closable inlet, which housing contains a first area for receiving the cell-containing fraction, a second area located adjacent an opposite sealed end of said housing for receiving the cell-free fraction, and a membrane separator, which membrane separator comprises an enclosed narrow feed channel which is at one end in flow communication with the closable inlet for introduction of the cell-containing liquid and at the other end with the first area for receiving the cell-containing fraction which lies between said enclosed narrow feed channel and said housing, said membrane separator contains one or more hollow fibers which pass through said sealed end of the housing and at their open ends are in flow communication with the second area for receiving the cell-free fraction.

4,995,968

FILTERS

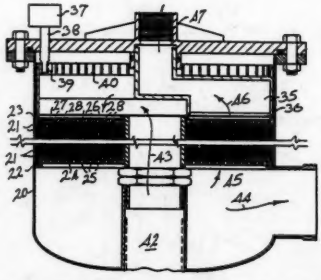
Peter J. Snelling, Unit 1, 14 Cocos Grove, West Lakes, Australia

Continuation of Ser. No. 96,607, Jul. 20, 1987, abandoned. This application Apr. 18, 1989, Ser. No. 341,256

Claims priority, application Australia, Nov. 21, 1985, PH3513

Int. Cl.[5] B01D *25/00, 29/38*

U.S. Cl. 210—108 5 Claims



1. A back flushable filter comprising a plurality of filter members, each filter member being generally annular in shape and being located in an adjoining cooperating relationship with other of the filter members to form a stack, each of the filter members including a plurality of divisions dividing each of said filter members into a plurality of radial sectors and within each sector a plurality of filter parts, each filter part in each sector being located and being shaped so as to provide in cooperation with and between filter parts of adjoining cooperating filter

members, a plurality of filter apertures in each sector having a shape defining converging sides to a narrowest gap wherein said converging sides are formed from adjoining cooperating filter members, the filter members in the stack defining for each thus formed converging filter aperture and within each sector a plurality of supply conduits connecting to a widest end of each filter aperture, said supply conduits coupled to a source and the filter members defining a plurality of exit conduits within each sector connecting to a narrowest end of each filter aperture and means to connect a back flow to said exit conduits in one or more selected sector to effect a back flush through said plurality of filter apertures within said one or more selected sector.

4,995,969

TREATMENT SYSTEM FOR LANDFILL LEACHATE

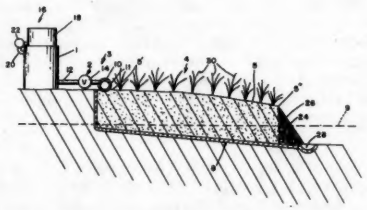
Ronald L. LaVigne, P.O. Box 578, Leeds, Mass. 01053

PCT No. PCT/US87/00145, § 371 Date Aug. 29, 1988, § 102(e) Date Aug. 29, 1988

Continuation of Ser. No. 822,125, Jan. 24, 1986, Pat. No. 4,678,582. This PCT application Jan. 22, 1987, Ser. No. 250,599 The portion of the term of this patent subsequent to Jul. 7, 2004, has been disclaimed.

Int. Cl.[5] C02F *3/32, 3/04*

U.S. Cl. 210—150 **10 Claims**



1. A system for treating landfill leachate comprising:

(a) a leachate supply source,

(b) a water impervious treatment basin which slopes from a high end to a low end,

(c) a layer of treatment medium means which is selected from the group consisting of peat moss and a mixture of peat moss and sand for providing a substantially large surface area for enhancing the fixation and proliferation of microbes and for supporting plants for growth,

(d) leachate tolerant plants growing in the treatment medium means,

(e) inlet flow control means operatively connected to the leachate supply source and the treatment basin for introducing leachate to the upper portion of the treatment medium means at the high end of said treatment basin which allows the leachate to penetrate and flow vertically and horizontally through the treatment medium means, and

(f) outlet flow control means for draining the treated leachate from the treatment medium means at the low end of the basin and for collecting the drained treated leachate at a point below said treatment medium means, said outlet flow control means comprising a drainage medium means for draining the landfill leachate, said drainage medium means being horizontally adjacent to said layer of treatment medium means, whereby the landfill leachate is first treated by said treatment medium means after which said treated landfill leachate flows through said drainage medium means.

4,995,970

STEERING FORCE CONTROL APPARATUS FOR POWER STEERING SYSTEM

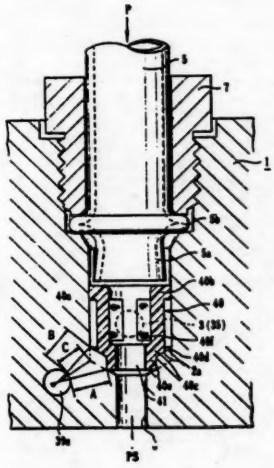
Hiroshi Ohsakai, Saitama, Japan, assignor to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Jul. 17, 1989, Ser. No. 381,217

Claims priority, application Japan, Jul. 29, 1988, 63-189849

Int. Cl.[5] B01D *35/02*

U.S. Cl. 210—167 **5 Claims**



1. A steering force control apparatus for a power steering system, comprising:

a main hydraulic path hole extending from a pump to a power steering side, said main hydraulic path hole having a tapered stepped outlet portion;

a branch path hole having one end open to said said main hydraulic path hole midway along said main hydraulic path hole and extending to a hydraulic reaction mechanism; and

a cylindrical filter located along the main hydraulic path hole, said filter having a through bore and a mesh portion for filtering pressurized oil, said mesh portion being formed at a first portion of said filter at which said main hydraulic path hole communicates with said branch path hole,

said filter having a tapered portion located along said main hydraulic path hole downstream of said branch path hole, and

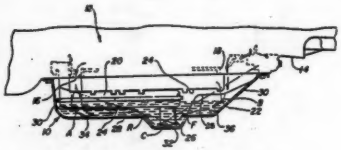
said filter having upper and lower ring frame members joined by said first filter portion, said upper ring frame member having an outer diameter sized so as to provide a press fit within said main hydraulic path hole wherein the portion of the through bore in the vicinity of the lower ring frame member constitutes a filter outlet portion, said lower ring frame member and said first filter portion having an outer diameter smaller than that of said upper ring frame member to form an elongated annular space located between said mesh portion and said main hydraulic path hole, and said tapered portion of said lower ring frame member being positioned in registration with the tapered stepped outlet portion of said main hydraulic path hole so that said filter permits some of the pressurized oil to flow along said main hydraulic path hole through said filter through bore to the outlet portion thereof and the remainder of the pressurized oil to pass through said mesh portion and the annular space to said branch path hole.

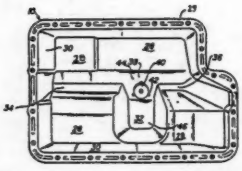
4,995,971

DUAL PURPOSE AUTOMATIC TRANSMISSION OIL PAN

Timothy A. Droste, Howell; Jerome J. Middione, Livonia, and Himat B. Kher, Troy, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Aug. 7, 1989, Ser. No. 390,022
Int. Cl.[5] F01M 11/06
U.S. Cl. 210—168 14 Claims





1. An oil pan in combination with an automatic transmission of a vehicle utilizing oil including a transmission case adapted for movement with the vehicle in predetermined angular orientations when negotiating normal grades and having spaced oil drain openings, a filter cartridge having an inlet port, and a plurality of valve body components, said filter cartridge and valve body components defining a lower surface, the oil pan comprising:

a unitary member having a basewall and sidewalls adapted to be secured to the transmission case to cover the filter cartridge and valve body components;

said basewall being spaced from the lower surface and contoured to correspond to the shape of said lower surface, said basewall having a sump portion located intermediate the spaced drain openings, said sump portion adapted to receive the inlet port of the filter cartridge;

a first drainback channel defined in the basewall and extending from the one of said drain openings to the sump;

a second drainback channel defined in the basewall and extending from the other of said drain openings to the sump;

said first and second drainback channels being spaced further from said lower surface than said basewall, said first and second drainback channels open into said sump in a manner to form a confluence region therewith so that oil flowing through the first and second drainback channels drains onto a surface of the sump; and

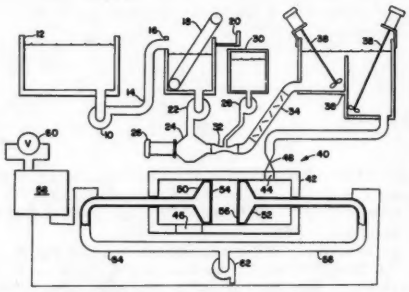
said sump portion being spaced further from said lower surface than both of said first and second drainback channels and cooperating with said drainback channels to maintain said inlet port submerged when said unitary member is secured to the transmission case.

4,995,972

METHOD AND APPARATUS FOR REMOVING LIQUID FROM PERMEABLE MATERIAL

Timothy A. Kramer, 606 Bay Ave., Pt. Pleasant Beach, N.J. 08742, and Kent M. Kramer, 7 Williams St., Rumson, N.J. 07760

Division of Ser. No. 173,811, Mar. 3, 1988, Pat. No. 4,818,415.
This application Nov. 14, 1988, Ser. No. 270,699
Int. Cl.[5] B01D 17/00, 25/12, 33/22
U.S. Cl. 210—179 40 Claims



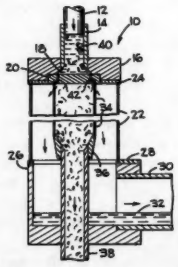
1. Apparatus for removing liquid from a permeable material, comprising means for enabling vaporized liquid, as it expands, to force at least some of the remaining unvaporized liquid through at least one surface which is permeable to the liquid contained in the material, said means including constraining means for constraining the material such that the material interfaces with said at least one surface, and heating means for repeatedly heating the material at at least one location remote from said at least one surface to a temperature sufficiently high to cause the in situ vaporization of the liquid in the vicinity of said at least one location.

4,995,973

MODULAR LONGITUDINAL SPRAY FINISHER

William Ballenger; Wayne Sherman, and Michael Suter, all of Lakeland, Fla., assignors to FMC Corporation, Chicago, Ill.

Filed Mar. 6, 1989, Ser. No. 319,021
Int. Cl.[5] B01D 35/22
U.S. Cl. 210—209 6 Claims



1. A filter means for separating a liquid slurry into a clarified component and a reduced liquid component, said filter means having a housing, said filter means comprising:

an inlet port for receiving said liquid slurry;

orifice plate means in communication with said inlet port and having orifice means for directing said liquid slurry;

screen means positioned outboard of said orifice means, said screen means providing an interior chamber having angled walls, said angled walls from an angle of less than ninety degrees, in said filter means housing contingent

with said orifice plate means in the path of said liquid slurry being directed at said screen means by said orifice means;

manifold means for receiving said clarified component outside said screen means chamber, and

a discharge line means for receiving said reduced liquid component from said interior chamber of said screen.

4,995,974

SEPARATOR ELEMENT

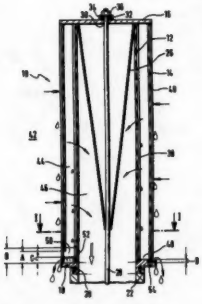
Manfred Lorey, Gänsgasse 9, D-6456 Langenselbold, and Karl Pötz, Oberursel, both of Fed. Rep. of Germany, assignors to Manfred Lorey, Langenselbold, Fed. Rep. of Germany

Filed Apr. 5, 1989, Ser. No. 334,043

Claims priority, application Fed. Rep. of Germany, Apr. 6, 1988, 3811441

Int. Cl.[5] B01D *29/15*

U.S. Cl. 210—247 **13 Claims**



1. A separator element for use in a device for separating water and contaminants from fluids, wherein said device includes a coalescing element, comprising a hollow filter body arranged within the coalescing element and having a first hydrophobic filter layer surrounding an inner flow chamber, said layer being spaced from and surrounded by the coalescing element to provide an outer flow chamber, one end face of the filter body being closed and the other end thereof being provided with a flow opening, a second hydrophobic filter layer upstream of the first filter layer as respects incoming flow, and said filter layers being arranged to provide an interspace between them.

4,995,975

UNITARY WATER COOLER FILTER

William E. Jacquot, Morgan Hill; Richard L. Tettman, Los Gatos, and Melvin D. Davis, Santa Clara, all of Calif., assignors to Western Temco, Inc., Los Gatos, Calif.

Continuation of Ser. No. 282,465, Dec. 9, 1988, abandoned. This application Jun. 20, 1990, Ser. No. 540,858

Int. Cl.[5] B01D *24/08*

U.S. Cl. 210—266 **6 Claims**

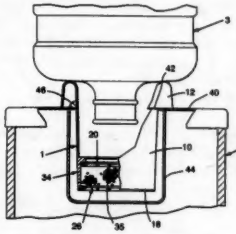
1. A filter device for use in a water cooler, said cooler having a base, a water outlet, a generally planar upper surface having a circular orifice of receiving the neck of an inverted water bottle and a reservoir chamber for receiving water from said inverted bottle prior to dispensing said water, wherein said filter device is adapted for fitment within said circular orifice and wherein it comprises

a unitary hollow cylindrical housing having an open top end and an open bottom end, said housing including

a hollow cylindrical canister body formed of a water-impervious material and having an outer diameter small enough to fit within the circular orifice of the cooler and an axial length dimensioned to fit within the said reservoir chamber and an axial length and an inner diameter large enough to receive the neck portion of the inverted water bottle, said canister body at its open top end continuously flaired outwardly and then downwardly to form.

a downwardly facing circular flange, said flange being hollow with an inner wall, a top surface and a downwardly depending outer wall and open at its bottom surface, said flange being coaxial with the canister body and having an diameter for its downwardly depending outer wall which exceeds the diameter of the circular orifice such that when the canister body of the device is inserted into the circular orifice, the open bottom surface of said flange rests upon the upper surface of the water cooler, said flange being made of the same material as the canister body and being of a thickness and rigidity in its top surface and outer wall which is adequate to support the inverted water bottle and transmit the weight of the water bottle to the upper surface of the water cooler and

a perforated baffle continuous with said canister body and



extending radially across the hollow canister body at a position below the distance to which the neck of the inverted water bottle extends;

a lower retaining means capable of passing water while retaining a filter medium, positioned within said housing at the lower end thereof;

a silver-impregnated activated carbon filter medium capable of removing chlorine and absorbable organic chemicals from potable water, positioned on the upper surface of said lower retaining means; and

an upper retaining means capable of passing water and excluding particulate matter, and capable of retaining said filter medium, positioned on the upper surface of said filter medium;

wherein the distance between said upper perforated panel and said flange, and the inner diameter of said housing, are selected to provide for a flow rate of at least 0.03 oz/sec through said filter device when said filter device is inserted into a water cooler and the neck of a water-containing water bottle placed inverted in the top end of said housing.

4,995,976

WATER PURIFICATION STRAW

Sheldon A. Vermes, Shoreview; David M. Botts, Spring Park, and Charles A. Peterson, Hopkins, all of Minn., assignors to Water Technologies Corporation, Plymouth, Minn.

Filed May 31, 1990, Ser. No. 531,125

Int. Cl.[5] B01D *24/08*

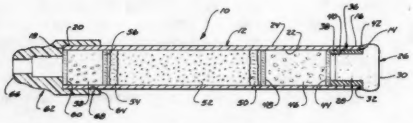
U.S. Cl. 210—266 **16 Claims**

12. An orally usable filter straw for the purification of water by forced movement of water through the straw including:

an elongated tubular passageway having an inlet at a distal end thereof and an outlet at a proximal end thereof, with the following materials retained within the passageway:

an inlet filter removably mounted at the inlet of the passageway, the filter being retained within the passageway by a retention ring surrounding the filter and of size to frictionally engage in inner surface of the passageway;

a first porous spacer of a plurality of porous spacers positioned within the passageway, the first porous spacer proximally adjacent to the retention ring, the porous spacers having a pore size larger than the filter pore size;
a purification material proximal to the first porous spacer filling the passageway between the first spacer and a second porous spacer proximally adjacent to the purification material;
a first resilient foam layer of a pair of resilient foam layers, the first foam layer proximally adjacent to the second porous spacer;
activated carbon material proximal to the first foam layer



filling the passageway between the first foam layer and a second foam layer proximally adjacent to the carbon material, the foam layers exerting a small compression force on the activated carbon and permitting the carbon particles to expand;
a third porous spacer proximally adjacent to the second foam layer;
a bactericide material proximal to the third porous spacer filling the passageway between the third porous spacer and a fourth porous spacer proximally adjacent to the bactericide material; and
a tubular mouthpiece mounted at the outlet of the passageway.

4,995,977

APPARATUS FOR FILTERING AND SEPARATING FLOW MEDIUM

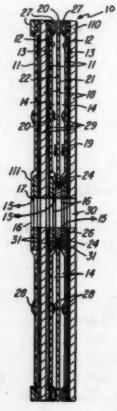
Walter Hilgendorff, Tespe; Gerhard Kahn; Jürgen Kaschemekat, both of Geesthacht, all of Fed. Rep. of Germany, assignors to GKSS- Forschungszentrum Geeshtacht GmbH, Geesthacht, Fed. Rep. of Germany

Filed Feb. 9, 1989, Ser. No. 308,853

Claims priority, application Fed. Rep. of Germany, Feb. 9, 1988, 3803886

Int. Cl.[5] B01D *65/04*

U.S. Cl. 210—321.69 **9 Claims**



1. In an apparatus for filtering and separating flow medium by reverse osmosis, ultrafiltration, and microfiltration, with a plurality of essentially sheet-like filter elements being disposed next to, and spaced from, one another in such a way as to form respective flow chambers for the flow medium, and with filtrate that is produced being withdrawn at the end face of at least one hole formed in a filter element and disposed essentially at right angles to the planar surface of that filter element, the improvement comprising:

a plurality of sheet-like, self-supporting, filter element carriers that are successively arranged and have opposite sides, upon each interior one of which is disposed essentially laminarly a respective one of said filter elements, with said carriers being spaced from one another by such a distance that when said filter elements are disposed thereon, one of said flow chambers is formed between each two facing filter elements; and

disposed in each flow chamber, between two facing filter elements, a respective disk that imparts turbulence to said flow medium in said flow chamber, with a given one of said disks being disposed between two filter elements in such a way that said disk essentially does not contact said two filter elements and also is movable in at least one axis of freedom.

4,995,978

HOLDER FOR INCLINING A COFFEE CARTRIDGE

Harold P. Van de Gang, Groningen, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

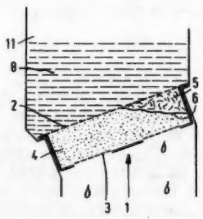
Continuation of Ser. No. 118,091, Nov. 15, 1987, abandoned.

This application Sep. 12, 1989, Ser. No. 406,823

Claims priority, application Netherlands, Nov. 12, 1986, 8602863

Int. Cl.[5] B01D *29/085*

U.S. Cl. 210—474 **11 Claims**



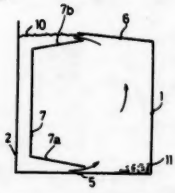
1. A filter device comprising a coffee-cartridge holder constructed to receive a coffee cartridge having two facing walls made of a filter material, one of said walls being flat and adapted to receive water for making coffee, the device also comprising means which ensure that, when the holder contains a coffee cartridge and is in the operating position, the wall of the filter material to which water is supplied is inclined at an angle between 15° and 90° to the horizontal, and wherein the coffee cartridge comprises a housing, the facing wall of a filter material constituting the upper and the lower wall of the housing and being interconnected by an upright peripheral wall, the upright peripheral wall being provided with a projecting supporting rim which is inclined relative to the filter wall to which water is supplied.

4,995,979

SETTLING DEVICE FOR SEPARATING TRUB FROM HOT WORT

Christiaan W. Versteegh, Delft, Netherlands, assignor to Heineken Technisch Beheer B.V., Amsterdam, Netherlands

Division of Ser. No. 103,516, Oct. 1, 1987, Pat. No. 4,861,608.
This application Aug. 28, 1989, Ser. No. 399,167
Claims priority, application Netherlands, Oct. 2, 1986, 8602488
Int. Cl.[5] B01D *21/02*
U.S. Cl. 210—521 12 Claims



1. A setting device for separating trub from hot wort liquid, which device includes a container having filling and drain means, a bottom wall, at least one side wall, a top, and an upstanding partition wall dividing the interior of the container into a smaller first space for accommodating a first column of the wort liquid and a larger second space for accommodating a second column of the wort liquid, said partition wall having an upper end in the region of the top of said container and a lower end separated from said bottom wall by a first gap establishing communication between said first and second spaces near the bottom of the container;

wherein the improvement comprises:

(a) a top wall member arranged in overlying relation to said second space and said upper end of said partition wall and forming means to screen the surface of the second column of wort liquid against heat loss;

(b) the underside of said top wall member being spaced from said upper end of said partition wall to define thereat a second gap establishing communication between said first and second spaces adjacent the top of said container; and

(c) the top of said container over said first space being open to permit heat loss from the uncovered surface of the first column of wort liquid;

(d) whereby the wort liquid in said first space becomes heavier than the wort liquid in said second space and a gravity-induced circulation of the wort liquid is affected from said first space through said first gap into said second space and from the latter through said second gap into said first space to cause settled trub in said second space to be swept together on said bottom wall of said container.

4,995,980

SYSTEM FOR BIOLOGICAL PURIFICATION OF WATER CONTAINING ORGANIC MATERIALS AND DERIVATIVE PRODUCTS

Jean M. Jaubert, Parc Coromandel, 18 Ave. Gravier, 06100 Nice, France

Filed Feb. 8, 1989, Ser. No. 307,613
Claims priority, application France, Feb. 8, 1988, 88 01553
Int. Cl.[5] C02F *3/30*
U.S. Cl. 210—602 15 Claims

1. A process for biologically purifying aquarium water and aquaculture ponds water as well as fresh water or salt water carrying solid organic substances or dissolved organic substances or dissolved mineral substances from the degradation of said organic substances which process comprises:

(a) flowing water to be purified through at least one path;

(b) stirring and contacting said water to be purified, in said path, with oxygen or with an oxygen rich gas, to provide aerobic conditions in said water to be purified;

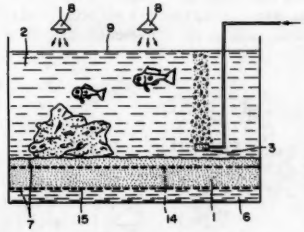
(c) filling a confined volume with oxygen impoverished water to provide anaerobic conditions and linking, through a porous connector, said confined oxygen impoverished water with said water to be purified:

(i) creating in the thickness of said connector, one aerobic zone in contact with said water to be purified, and one anaerobic zone in contact with said confined water, and

(ii) establishing between said water to be purified and said confined oxygen-impoverished water, gradients of concentration of dissolved mineral substances that compel said mineral substances to diffuse throughout said porous connector according to said gradients of concentration;

(d) introducing unicellular aerobic microorganisms in said porous connector aerobic zone in contact with said water to be purified, to transform into mineral substances, solid as well as dissolved organic substances carried by said water to be purified; said aerobic microorganisms comprising bacteria that transform organic nitrogen into NH_4^+, then NH_4^+ into NO_2^-, then NO_2^- into NO_3^-;

(e) introducing unicellular anaerobic microorganisms in said porous connector anaerobic zone in contact with said confined water, to reduce said mineral substances; said



anaerobic microorganisms comprising heterotrophic denitrifying bacteria which transform into molecular nitrogen and oxygen nitrites and nitrates that diffuse from said porous connector aerobic zone to said porous connector anaerobic zone;

(f) substantially preventing light from reaching said porous connector anaerobic zone to prevent any photosynthetic oxygen release in said porous connector anaerobic zone; and

(g) introducing in the thickness of said porous connector pluricellular burrowing detritus-eating animals that supply said heterotrophic denitrifying bacteria with organic carbon; said organic carbon coming from organic substances carried by said water to be purified and being incorporated into said porous connector anaerobic zone by the excretion as well as by the biostirring activity of said burrowing detritus-eating animals; said biostirring activity being sufficiently low to maintain in said porous connector an oxygen-impoverished zone having an oxygen content not exceeding about 1.5 mg/l and an oxygen-rich zone having an oxygen content greater than said oxygen-impoverished zone.

4,995,981

PROCESS FOR ANAEROBICALLY DEGRADING HIGHLY LOADED PROCESS WASTE WATERS

Erich Gött, Lahr, Fed. Rep. of Germany, assignor to Reiflock-Umwelttechnik Margot Reichmann, Baden-Baden, Fed. Rep. of Germany

Filed Jan. 24, 1990, Ser. No. 469,169
Claims priority, application Fed. Rep. of Germany, Feb. 1, 1989, 3902867
Int. Cl.[5] C02F *3/28*
U.S. Cl. 210—603 1 Claim

1. A process for the anaerobic degradation of highly concen-

trated chemical process waste waters in which the CBS constant is up to 10^6 mg/l or greater, comprising the steps of:

inducing putrefication of a putrefactive sludge in at least one decomposition tank zone at about 34° C;

mixing said putrefactive sludge by continuous circulation by withdrawing from the bottom zone of said decomposition tank and adding inoculation sludge in the top zone of the decomposition tank by a sludge pump through a circulation conduit external to said tank;

simultaneously admitting putrefactive water at different levels of the decomposition tank in order to assure constant and thorough mixing of the contents of the decomposition tank;

feeding oxygen into the decomposition tank in small amounts for preventing H_2S formation;

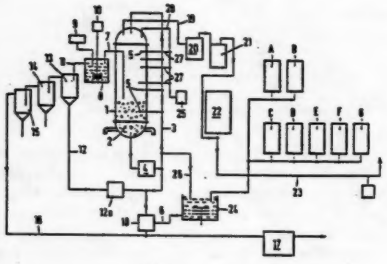
after initally including said putrefaction, stopping the adding of any additional communal sewage sludge;

providing a source of chemical process waste waters;

separating said chemical process waste waters into individual tank zones, analyzing said chemical process waste waters;

passing said waters from said tanks continuously into a mixing tank zone;

premixing said chemical process waste waters and said sludge in the mixing tank to a premixed selected composition depending on the putrefactive sludge and waters;



passing said premixed composition into said decomposition tank zone;

passing said putrefactive sludge downstream from said decomposition tank zone to a flocculating tank zone connected thereto;

providing a source flocculating agent;

adding an exactly metered amount of said flocculating agent into said flocculating tank to said sludge and thoroughly mix said agent with said sludge to produce a flocculated putrefactive sludge;

recycling said flocculated putrefactive sludge from a second tank zone into the external circulation for recirculating the putrefactive sludge back into the decomposition tank zone;

displacing part of the sludge from the flocculating tank zone and causing the settling of the coarse sludge to take place in said second tank zone connected downstream of said flocculating tank zone to produce a cloudy water;

feeding said cloudy water into a third or last tank zone for settling the portions of sludge still present;

displacing the cloudy water in the last tank and transferring it through a buffer tank to a biological stage or recycling it into the decomposition tank zone;

said decomposition tank zone generating a gas and passing said generated gas from said decomposition tank into a gas tank zone; and

withdrawing said gas from the process.

4,995,982

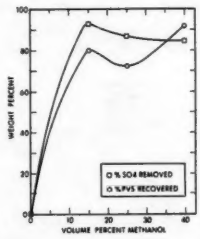
PROCESS FOR RECOVERING AND PURIFYING A HIGH MOLECULAR WEIGHT SULFONATE

Richard T. Barthorpe, Littleton, Colo., assignor to Marathon Oil Company, Findlay, Ohio

Filed Nov. 1, 1989, Ser. No. 430,849

Int. Cl.[5] B01D *11/04*

U.S. Cl. 210—634 **14 Claims**



1. A process for recovering and purifying a polymeric sulfonate containing aqueous solution consisting essentially of:

(a) adding to an aqueous solution having a polymeric sulfonate and deleterious by-products of sulfonation dissolved therein a solfonate selected from methanol, ethanol, acetone or dipropylene glycol monomethyl ether, in a first amount of from about 7.5 to about 40 volume percent of said aqueous solution, said aqueous solution to which said solvent has been added in said first amount forming a first upper phase and a first lower aqueous phase;

(b) separating said first upper phase from said first lower aqueous phase;

(c) adding water to said first lower aqueous phase in an amount sufficient to obtain a volume of said first lower aqueous phase which is approximately equal to the volume of said aqueous solution;

(d) adding said solvent to said first lower aqueous phase in a second amount of from about 7.5 to about 40 volume percent of the volume of said aqueous solution thereby forming a second upper phase and a second lower aqueous phase; and

(e) separating said second lower aqueous phase from said second upper phase, said second lower aqueous phase having a majority of said polymeric sulfonate dissolved therein while said first and said second upper phases having a majority of said deleterious by-products of sulfonation dissolved therein.

4,995,983

MEMBRANE SEPARATION PROCESS

Donald T. Eadie, North Vancouver, and Thomas M. Fyles, Victoria, both of Canada, assignors to MacMillan Bloedel Limited

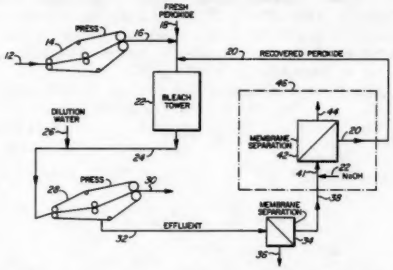
Filed Mar. 21, 1990, Ser. No. 496,576

Int. Cl.[5] B01D *61/16*

U.S. Cl. 210—639 **12 Claims**

4. A method of recovering residual peroxide in the manufacture of cellulose pulp comprising separating an effluent containing residual peroxide and contaminants from said pulp, separating said effluent into a first retentate and a first permeate by a first separation membrane, said first permeate containing a major portion of said residual peroxide and a smaller portion of said contaminants than to said retentate, increasing the pH of said first permeate to convert said residual peroxide in said first permeate into an ionized form, separating said first permeate via a reverse osmosis membrane into a second retentate and a second permeate, said second permeate having a

lower concentration of said peroxide in ionized form than said first permeate and said second retentate having a higher concentration of said peroxide in ionized form than said first permeate.



4,995,984

SUPPORTED HETEROPOLYCYCLIC COMPOUNDS IN THE SEPARATION AND REMOVAL OF LATE TRANSITION METALS

Aaron Barkatt, Silver Spring, Md., assignor to Pedro B. Macedo, Bethesda and Theodore Aaron Litovitz, Annapolis, both of, Md.

Division of Ser. No. 101,920, Sep. 28, 1987, Pat. No.
Int. Cl.[5] C02F *1/28*
U.S. Cl. 210—670 **27 Claims**

1. A process for removing one or more transition metal ions selected from the group consisting of one or more ions of the elements of Groups Va, VIa, VIIa, VIII, Ib and IIb of the Periodic Table from a liquid containing said transition metal ions which comprises passing said liquid over a composition including an activated carbonaceous porous support having interconnected pores wherein said support has an internal surface which contains a heteropolycyclic moiety capable of forming a stable compound or complex with said transition metal ions, said heteropolycyclic moiety containing a bipyridyl structure or a phenanthroline structure said heteropolycyclic moiety being present in an amount effective to form a compound or complex with said transition metal ions.

4,995,985

GEL BEAD COMPOSITION FOR METAL ADSORPTION

Charles D. Scott; Charlene A. Woodward, and Charles H. Byers, all of Oak Ridge, Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Division of Ser. No. 333,064, Apr. 4, 1989. This application Apr. 25, 1990, Ser. No. 514,067
Int. Cl.[5] C02F *1/28*
U.S. Cl. 210—679 **4 Claims**

1. A process for removing metals from an aqueous stream comprising: mixing an aqueous stream containing metals with gel beads of propylene glycol alginate and bone gelatin thereby trapping said metals within said beads.

4,995,986

WASTEWATER TREATMENT USING MAGNESIUM SILICATE

Michael F. Mohn, Levittown, Pa., assignor to Betz Laboratories, Inc., Trevose, Pa.

Filed Aug. 13, 1990, Ser. No. 566,647
Int. Cl.[5] C02F *1/56*
U.S. Cl. 210—717 **9 Claims**

1. A method for removing contaminants from wastewater comprising generating amorphous precipitated magnesium silicate therein by adding to said wastewater a sufficient amount for the purpose of an aqueous solution of magnesium chloride and a sufficient amount for the purpose of an aqueous solution of sodium silicate.

4,995,987

ENHANCEMENT OF THE EFFICACY OF ANTIMICROBIALS BY THE ADDITION OF ANIONS CAPABLE OF INTERFERING WITH MICROBIAL ELECTROCHEMICAL REACTIONS

Wilson K. Whitekettle, Conroe, Tex., and John T. Conlan, Ventura, Calif., assignors to Betz Laboratories, Inc., Trevose, Pa.

Filed Sep. 21, 1989, Ser. No. 410,765
Int. Cl.[5] C02F *1/50*
U.S. Cl. 210—754 **12 Claims**

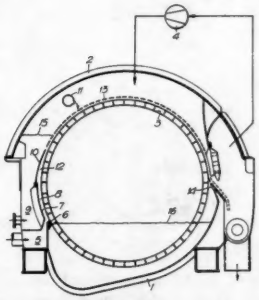
1. A method of enhancing the efficacy of an anti-microbial compound selected from the group consisting of chlorine, chlorine dioxide, bromochlorine, ozone, bromo substituted hydantoins, chloro substituted hydantoins and halogenated triazines which is added to an aqueous medium to inhibit the growth of sulfate reducing bacteria comprising adding to said aqueous medium an anion compound selected from the group consisting of molybate, tungstate, selenate, chromate, dichromate, nitrate and phosphate in combination with said anti-microbial compound.

4,995,988

METHOD AND APPARATUS FOR THICKENING A SLURRY USING A COMPRESSION PLATE

Aaro Ahlgren, Pori, Finland, assignor to Sunds Defibrator Rauma Oy, Rauma, Finland

Filed Dec. 14, 1988, Ser. No. 286,386
Claims priority, application Finland, Nov. 11, 1988, 885228
Int. Cl.[5] B01D *33/044*
U.S. Cl. 210—784 **6 Claims**



1. A method for thickening of slurry and for its treatment with liquid, comprising the steps of:

passing the slurry to be thickened onto a filter face of a drum revolving in a basin covered by a hood so as to form a space surrounding the drum;

passing the treatment liquid through the pulp web formed on the drum; and

increasing the consistency of the pulp web by pressing a flexible compression plate against the pulp web by means of a pressure acting upon the face of the flexible compression plate facing away from the drum, said pressure arising solely from at least one of hydrostatic pressure of the treatment liquid and overpressure of a gas within said space.

4,995,989

SEPARATING LIQUIDS

Noel Carroll, Sassafras, and Charles M. Kalnins, Malvern, both of Australia, assignors to Conoco Specialty Products Inc., Houston, Tex.

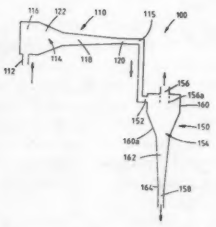
PCT No. PCT/AU89/00069, § 371 Date Dec. 15, 1989, § 102(e) Date Dec. 15, 1989, PCT Pub. No. WO89/07490, PCT Pub. Date Aug. 24, 1989

PCT Filed Feb. 20, 1989, Ser. No. 455,402

Claims priority, application Australia, Feb. 19, 1988, 6870/88; Mar. 30, 1988, 7509/88; May 17, 1988, 8278/88; Sep. 19, 1988, 0509/88; Oct. 14, 1988, 0942/88

Int. Cl.[5] B01D *21/26*

U.S. Cl. 210—788 18 Claims



1. A method of separating components of a liquid mixture comprising passing the mixture to a cyclonic device from which the components of the mixture are taken via one outlet and then together passed to a separating device from which the separated components are separately taken.

4,995,990

AIR AND WATER DISTRIBUTION CONDUIT

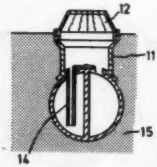
Philip A. Weston, Newbury, Great Britain, assignor to PWT Projects Limited, Great Britain

Filed Apr. 6, 1989, Ser. No. 334,716

Claims priority, application United Kingdom, Apr. 7, 1988, 8808133

Int. Cl.[5] B01D *29/62*

U.S. Cl. 210—793 9 Claims



9. A method of supplying a combined air scour and water backwash to a granular media filter by incorporating therein and using an underdrain system comprising perforated lateral conduits arranged for the distribution of air and water for scouring and backwashing of the filter, each conduit being in the form of a single linear conduit containing two or more separate axially parallel ducts separated by one or more internal wall(s), the improvement consisting in that each duct has an external wall in common with its conduit, which external wall is provided with axially spaced apertures for emission of water or air, said axially spaced apertures located in an upper position in at least one of the ducts projecting downwards into the duct as an inwardly extended duct, and in that in each conduit at least one duct is arranged for the distribution of air and at least one duct is arranged for the distribution of water, there being no air and water intercommunication between the ducts.

4,995,991

METHOD AND APPARATUS FOR IMPROVING THE OPERATION OF A DISC FILTER

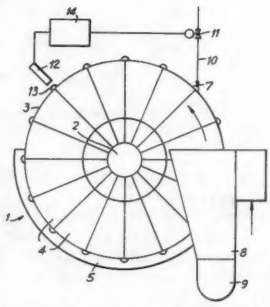
Risto Ljokkoi, Karhula; Tapani Niiranen, Savonlinna, both of Finland; Pekka Purho, Tokyo, Japan; Erkki Savolainen, Haapakallio, and Jari Siitonen, Jyväskylä, both of Finland, assignors to Ahlstrom Corporation, Noormarkku, Finland

Filed Mar. 21, 1989, Ser. No. 326,311

Claims priority, application Finland, Mar. 22, 1988, 881348

Int. Cl.[5] B01D *33/26, 29/76*

U.S. Cl. 210—797 15 Claims



1. A method of detaching pulp cakes from the surface of a rotating disc filter that is divided into a plurality of segments which are sequentially immersed in a basin containing fiber suspension to pick up said fiber from said suspension to form pulp cakes on said segments, said method comprising:

directing a jet of pressurized fluid at a portion of the boundary between the filter surface and the pulp cake for dislodging said pulp cake from the filter for a time beginning when the leading edge of each of said pulp cakes registers with said jet and discontinuing said jet prior to each of said pulp cakes moving out of register with said jet and allowing the remainder of said pulp cake to fall from the filter by action of gravity.

4,995,992

APPARATUS FOR HEATING AND DEMOISTURIZING DIESEL FUEL

Erwin E. Hurner, 920 Belsly Blvd. South, Moorhead, Minn. 56560

Filed Feb. 13, 1989, Ser. No. 309,105

Int. Cl.[5] B01D *21/00*

U.S. Cl. 210—803 8 Claims

1. A process for treating fuel wherein said fuel is introduced into an apparatus comprising the steps of:

Providing an apparatus comprising;

means defining a settling chamber having a side wall, top and bottom,

first conduit means passing through said top of said chamber and extending to a lower portion of said chamber, said conduit means defining a fuel inlet int he lower portion of said chamber,

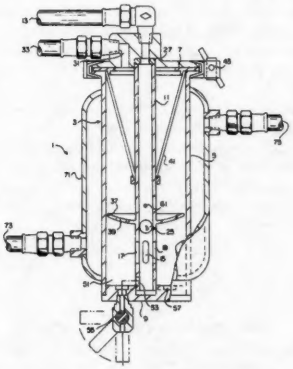
second conduit means passing through said top of said chamber defining a fuel outlet in an upper portion of said chamber, and

buoyant valve means within said first conduit means to permit fuel to flow in said inlet towards said outlet but to prevent fuel from flowing out of said inlet, said buoyant valve means movable within said first conduit means from a point below said inlet to a point above said inlet near said top of said settling chamber;

introducing said fuel into first conduit means, said fuel forcing said buoyant valve means to travel down said first

conduit means past said inlet to permit said fuel to flow through said inlet;

stopping the flow of said fuel thereby permitting said buoyant valve means to float up said first conduit means past said inlet to an upper portion thereof to close off said first



conduit means to fuel flow upon said buoyant valve means contacting a restriction in said first conduit means;

sediment within said first conduit means settling to the bottom of settling chamber during the flotation of said buoyant valve means toward said restriction in said first conduit means.

4,995,993

PROCESS FOR PREPARING OVERBASED METAL SULFONATES

Brian L. Papke, Wappingers Falls, and Leonard S. Bartley, Jr., Newburgh, both of N.Y., assignors to Texaco Inc., White Plains, N.Y.

Filed Dec. 18, 1989, Ser. No. 452,140

Int. Cl.[5] C10M *135/10*

U.S. Cl. 252—25 **6 Claims**

1. A method of preparing an amorphous overbased calcium sulfonate detergent for lubricants, said method comprising;

(a) mixing a solution of a calcium sulfonate in a volatile hydrocarbon solvent with CH_3OH and $Ca(OH)_2$ solids;

(b) stirring and heating said sulfonate mixture;

(c) adding to said stirred sulfonate mixture a sufficient amount of CO_2 to react with up to 80% of the $Ca(OH)_2$;

(d) adding an activates solid adsorbent to said CO_2 treated mixture to remove at least 35% of the water generated in the entire carbonation reaction;

(e) continuing addition of CO_2 until the total amount of CO_2 added exceeds 90–105% of the amount required to react with the $Ca(OH)_2$ solids;

(f) filtering said adsorbent-treated sulfonate mixture to separate the adsorbent and any unreacted $Ca(OH)_2$ solids from an amorphous calcium sulfonate product;

(g) stripping said sulfonate product of said volatile hydrocarbon solvent; and

(h) recovering the amorphous overbased calcium sulfonate product.

4,995,994

LUBRICANT

Haimi N. Singer, deceased, late of Parktown, South Africa (by Tamara Singer, executor), assignor to Singer & Hersch Industrial Development, South Africa

Filed Apr. 17, 1989, Ser. No. 339,547

Claims priority, application South Africa, Apr. 20, 1988, 88/2768

Int. Cl.[5] C10M *173/02*

U.S. Cl. 252—28 **13 Claims**

1. A lubricant composition comprising:

(i) a substantially oil-free, aqueous, emulsion-free water-based lubricant comprising a major amount of water, a minor but extreme pressure agent-effective amount of at least one substantially water-insoluble, oil-soluble functional additive stably dispersed therein, and a minor amount of at least one substantially water-soluble, liquid organic dispersing agent which dissolves and disperses the functional additive in the lubricant;

(ii) a particulate solid lubricant suspended in the water-based lubricant and uniformly dispersed therethrough; and

(iii) a thixotropic thickener which maintains the solid lubricant in suspension in the water-based lubricant.

4,995,995

LUBRICANT COMPRISING AN OIL-IN-WATER EMULSION, A PROCESS FOR THE PREPARATION THEREOF AND THE USE OF THE LUBRICANT

Michael J. Garvey, Heswall; Ian C. Griffiths, Bebington, and Ian Thompson, Chester, all of Great Britain, assignors to Unilever Patent Holdings B.V., Netherlands

Filed Sep. 20, 1988, Ser. No. 247,090

Claims priority, application European Pat. Off., Sep. 21, 1987, 87201792.6

Int. Cl.[5] C10M *125/26, 173/00*

U.S. Cl. 252—28 **18 Claims**

1. A lubricant consisting essentially of an oil-in-water emulsion and solid particles of partially hydrophobic silica, in which the oil is a lubricating material, characterized in that the oil droplets are stabilized by a surface coating of the partially hydrophobic silica particles having a size of less than 1 micrometer.

4,995,996

MOLYBDENUM SULFUR ANTIWEAR AND ANTIOXIDANT LUBE ADDITIVES

Catherine L. Coyle, Mendham, N.J.; Mark A. Greaney, Upper Black Eddy, Pa.; Edward I. Stiefel, Bridgewater, N.J.; James N. Francis, Maplewood, N.J., and Morton Beltzer, Westfield, N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Dec. 14, 1989, Ser. No. 450,751

Int. Cl.[5] C10M *135/14*

U.S. Cl. 252—42.7 **9 Claims**

1. A lubricating composition comprising: a major amount of an oil of lubricating viscosity; and, a minor amount of an additive having the formula Mo_2L_4 wherein L is a ligand selected from a xanthate and mixtures of xanthates.

4,995,997

ANTIBACTERIAL WATER-SOLUBLE CUTTING FLUID RESISTANT TO YEAST-LIKE FUNGI

Masahiro Noda; Masaharu Fuchigami, and Akira Akagawa, all of Kanagawa, Japan, assignors to Yushiro Chemical Industry Co., Ltd., Japan

Filed Feb. 14, 1990, Ser. No. 479,570

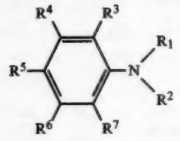
Claims priority, application Japan, Mar. 16, 1989, 1-62288

Int. Cl.[5] C10M *173/02*

U.S. Cl. 252—49.5 **4 Claims**

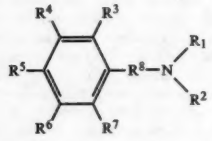
1. In an antimicrobial water-soluble cutting fluid comprising a mineral oil and/or fatty oil, an extreme-pressure additive and a surfactant, the improvement wherein said fluid further com-

prises an amine or amine derivative represented by the following formula (I):



(I)

or by the following (II):



(II)

wherein R^1 through R^7 individually mean a hydrogen atom, a substituted or unsubstituted alkyl, alkenyl, cycloalkyl, alkylaryl, aralkyl, aryl, hydroxyalkyl or alkoxyl group, or a nitrogen-containing heterocyclic group having up to 10 carbon atoms, R^1 and R^2 may be coupled together into a nitrogen-containing heterocyclic group along with the nitrogen atom to which R^1 and R^2 are bonded, or R^3 through R^7 individually mean a hydroxyl, amino, substituted amino, aminocarbonyl or aliphatic acyl group, and R^8 denotes an alkylene group having 1–4 carbon atoms.

4,995,998

SURFACTANT MIXTURES AS COLLECTORS FOR THE FLOTATION OF NON-SULFIDIC ORES

Wolfgang von Rybinski, and Rita Koester, both of Duesseldorf, Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf-Holthausen, Fed. Rep. of Germany

Filed May 30, 1989, Ser. No. 359,061

Claims priority, application Fed. Rep. of Germany, May 31, 1988, 3818482

Int. Cl.[5] B03D *1/14;* **C23B** *1/00;* **C11D** *1/12;* **C09K** *3/00*

U.S. Cl. 252—61 **11 Claims**

1. A composition for the flotation and collection of non-sulfidic ores, said composition comprising a mixture of

(a) at least one alkyl or alkenyl polyethylene glycol ether terminally locked by hydrophobic radicals, and

(b) at least one cationic or ampholytic surfactant, wherein the ratio by weight of component (a) to component (b) is in the range from about 1:20 to about 3:1.

4,995,999

METHOD OF PRODUCING MAGNETIC CARBON BLACK

Toshio Nakada; Fumio Takemura; Yoshihito Sema, and Kazuhito Kataoka, all of Gotenba, Japan, assignors to Tokai Carbon Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 328,395, Mar. 24, 1989, abandoned, which is a division of Ser. No. 154,259, Feb. 10, 1988, Pat. No. 4,900,465. This application May 21, 1990, Ser. No. 527,688

Claims priority, application Japan, Feb. 13, 1987, 62-29543; Feb. 23, 1987, 62-37886; Aug. 12, 1987, 62-199906; Oct. 7, 1987, 62-251699

Int. Cl.[5] C04B *35/52*

U.S. Cl. 252—62.55 **3 Claims**

1. A method of producing magnetic carbon black, comprising carbon black and magnetic fine particles dispersed and immobilized therein, comprising:

(A) burning a fuel to form a high temperature combustion gas stream;

(B) feeding, as a starting material for producing said carbon black, a hydrocarbon into said high temperature combustion gas stream at two downstream locations, the hydrocarbon being converted to carbon black at these locations;

(C) feeding at least one transition metal compound of at least one member selected from the group consisting of iron, nickel, and cobalt, into said high temperature combustion gas stream at a location intermediate said two downstream locations to effect formation of particulate magnetic carbon black;

(D) cooling the resulting mixture and separating the particulate magnetic carbon black therefrom; and

(E) heating the separated particulate magnetic carbon black to a temperature of about 400 to 900° C. in a non-oxidizing atmosphere sufficient to reduce metal oxides contained therein, and to thereby improve the magnetic characteristics thereof.

4,996,000

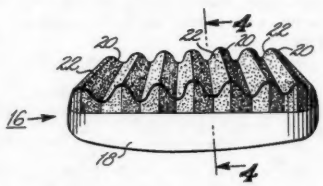
MULTILAYER CLEANSING BAR

Dale R. Redeker, 2914 Doncrest, Kalamazoo, Mich. 49007

Filed Feb. 3, 1989, Ser. No. 306,331

Int. Cl.[5] C11D *9/20, 17/00*

U.S. Cl. 252—92 **4 Claims**



1. A two layered cleansing bar comprising:

a first layer of a first solid, substantially nonabrasive, cleansing material;

a second layer of different solid cleansing material inseparably joined to said first layer along a substantially centrally located plane;

said second layer having undulations with each undulation having two halves and each half of each said undulation having different abrasiveness.

4,996,001

PUFFED BORAX AS AN AGGLOMERATING AID

Raymond T. Ertle, Pompton Plains, and Robert P. Arbaugh, Westampton, both of N.J., assignors to Capital City Products Company, Columbus, Ohio

Filed Jan. 23, 1989, Ser. No. 300,476

Int. Cl.[5] C11D *7/38, 7/00;* **C09K** *3/00*

U.S. Cl. 252—99 **8 Claims**

1. In a process for agglomerating a particulate mixture which includes predominantly one or more hydratable or hydrated inorganic salts; wherein the particulate mixture is sprayed while being agitated with an alkali metal silicate solution as a binder solution to form agglomerates which include the said salts, and the resulting agglomerates are subjected to an aging/drying step; the improvement which comprises using puffed borax in admixture with said particulates as an agglomerating aid to reduce aging/drying time, the puffed borax comprising from about 2% to about 90% of the total particulate initial feed mixture before addition of the silicate solution.

4,996,002

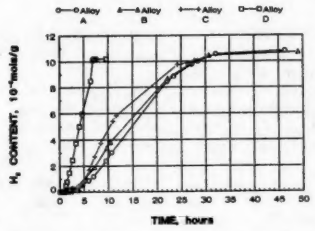
TOUGH AND PORUS GETTERS MANUFACTURED BY MEANS OF HYDROGEN PULVERIZATION

Gary D. Sandrock, Ringwood, and Winfred L. Woodard, III, Midland Park, both of N.J., assignors to Ergenics, Inc., Wyckoff, N.J.

Division of Ser. No. 126,750, Nov. 30, 1987, Pat. No. 4,839,085. This application Jun. 12, 1989, Ser. No. 365,182

Int. Cl.[5] H01J *7/18;* C22C *16/00;* C01B *6/24*

U.S. Cl. 252—181.6 4 Claims



1. A tough porous non-evaporable getter product produced according to steps as follows:

providing a solid alloy body of Zr, V and E wherein E consists of more than one of Fe, Ni, Mn and Al such that the proportions of each species are in weight percent

E from 4 to 5,

V from 10 to 16 and

Zr balance to make 100 and from 79 to 86,

introducing the body into a chamber and removing the air therefrom,

charging the body with hydrogen for hydride formation to induce spontaneous pulverization of the body into the hydride powder and/or granules, forming the powder and/or granules into a desired getter shape, and

sintering the shape under a dynamic vacuum or flowing inert gas at a temperature in the range of 900° to 1200° C. but below its melting temperature.

4,996,003

TITANIUM ACTIVATED HAFNIA AND/OR ZIRCONIA HOST PHOSPHOR CONTAINING A SELECTED RARE EARTH

Philip S. Bryan, Webster; Patrick M. Lambert; Christine M. Towers, both of Rochester, and Gregory S. Jarrold, Henrietta, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 436,855, Nov. 15, 1989, Ser. No. 437,140, Nov. 16, 1989, Ser. No. 437,141, Nov. 16, 1989, Ser. No. 437,142, Nov. 16, 1989, Ser. No. 437,143, Nov. 16, 1989, Ser. No. 437,228, Nov. 16, 1989, Ser. No. 437,423, Nov. 16, 1989, Ser. No. 437,465, Nov. 16, 1989, and Ser. No. 437,868, Nov. 16, 1989, each is a continuation-in-part of Ser. No. 305,222, Feb. 3, 1989. This application Jun. 29, 1990, Ser. No. 546,220

Int. Cl.[5] C09K *11/67*

U.S. Cl. 252—301.40 F 21 Claims

1. A phosphor capable of absorbing X-radiation and emitting longer wavelength radiation comprised of monoclinic crystals of a titanium activated hafnium dioxide and/or zirconium dioxide host consisting essentially of oxygen and combined elements satisfying the relationship

$$DTi_xM_yL'_w$$

wherein

D is at least one of zirconium and hafnium ions;

M is at least one alkali metal;

L' is at least one of yttrium, ytterbium, and lutetium;

w is in the range of from 1×10^{-6} to 1×10^{-3};

x is in the range of from 3×10^{-4} to 1.0; and

y is up to 1;

the phosphor exhibiting reduced afterglow when excited above X-radiation as compared to the phosphor as defined above absent L'.

4,996,004

PREPARATION OF PHARMACEUTICAL OR COSMETIC DISPERSIONS

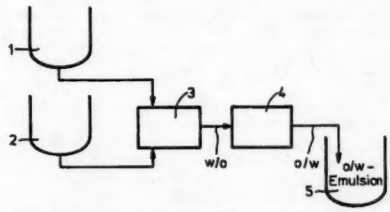
Manfred Bücheler, Overath; Hans Gehringer, Cologne; Bernd Klinksiek, and Bernd Koglin, both of Bergisch Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 518,902, Aug. 1, 1983, abandoned. This application Mar. 15, 1989, Ser. No. 324,985

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1983, 3230289

Int. Cl.[5] B01J *13/00*

U.S. Cl. 252—314 6 Claims



1. Process for the preparation of fine-particled, stable, pharmaceutical or cosmetic dispersions consisting of an aqueous phase and an organic oily phase which is insoluble or not completely soluble in water, characterized in that a pre-emulsion is pumped through a jet disperser which consists of one or more jets, which are designed as capillary bores with a diameter of 0.5 to 0.8 mm and have a length to diameter ratio of 1.5 to 2 the temperature, the proportions of the aqueous phase and the organic phase and the pressure at the jet disperser being adjusted so that phase inversion of the emulsion is effected in the jet disperser at the same time as homogenization and fine dispersion, and in the course of which all the pressure energy is consumed in the dispersing zone and the dispersion leaves the dispersing zone as a non-directional stream.

4,996,005

CONDUCTIVE COMPOSITION AND METHOD FOR MANUFACTURING PRINTED CIRCUIT SUBSTRATE

Mitsuru Saito; Satoru Matsumora, and Yasushi Watanabe, all of Miyagi, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Jun. 9, 1988, Ser. No. 204,439

Claims priority, application Japan, Sep. 25, 1987, 62-241309

Int. Cl.[5] H01B *1/06*

U.S. Cl. 252—512 16 Claims

1. A conductive composition comprising:

conductive particles which comprise copper, wherein said copper particles are coated with particles of silver, said silver particles being present in an amount at least to coat said copper particles sufficiently to minimize oxidation of said copper;

a binder which comprises diglycidyl ether of bisphenol A epoxy resin, wherein said binder has a molecular weight of from 1,600 to 5,500, said binder being present in said composition in a ratio to said conductive particles capable of at least dispersing said conductive particles before said binder is cured; and

a hardener selected from the group consisting of diaminodiphenolsulfon, diaminodiphenylmethane, and 2-ethyl-4-methylimidazole, wherein said hardener is present in an amount sufficient to cause said binder to cure.

4,996,006

SOLID SHAMPOO COMPOSITION IN COMPACT NEEDLE FORM WITH WATER AS A BINDER

Margaret J. Constantine, Poole, and Stanislaw Krysztal, Richmond, both of England, assignors to Constantine & Weir Ltd., Poole, England

Filed Feb. 21, 1989, Ser. No. 313,241

Claims priority, application United Kingdom, Feb. 23, 1988, 8804138

Int. Cl.[5] C11D *1/12, 1/755*

U.S. Cl. 252—550 10 Claims

1. A solid shampoo bar (comprising) consisting essentially of 70% to 90% detergent in the form of compacted solid needles and 1% to 10% water as a binder, the structure of the bar having the form of compacted needles.

4,996,007

PROCESS FOR THE OXIDATION OF ALCOHOLS TO ALDEHYDES/ACIDS/ESTERS

Kuo-Hua Chao; Tamal K. Dutta, both of Houston, and Lynn H. Slaugh, Cypress, all of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Jan. 19, 1990, Ser. No. 467,118

Int. Cl.[5] C11C *3/02, 1/00;* C07C *69/02, 69/66*

U.S. Cl. 260—410.9 R 7 Claims

1. A process for oxidation of primary saturated alcohols to a product consisting of aldehydes, acids, esters and mixtures thereof which comprises contacting a primary alcohol and molecular oxygen with a catalyst selected from the group consisting of ruthenium, rhodium, platinum, palladium, rhenium and mixtures thereof, optionally a cocatalyst comprising a quaternary alkyl ammonium bromide wherein the alkyl moieties have carbon numbers ranging from 1 to about 20 and an oxygen activator selected from the group consisting of dihydrodihydroxynaphthalene, dihydrodihydroxyanthracene and mixtures thereof, and subsequently separating from the reaction mixture the product aldehydes, acids and esters.

4,996,008

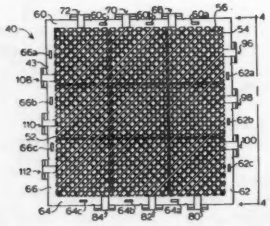
COOLING TOWER LIQUID CONTACT PLATE SUPPORT SYSTEM

Charles A. Peterson, 2201 Lord Ashley Dr., Sanford, N.C. 27330

Filed Jan. 22, 1990, Ser. No. 467,959

Int. Cl.[5] B01F *3/04*

U.S. Cl. 261—111 6 Claims



1. A liquid cooling tower construction, comprising:

(a) a housing formed for receiving air at one location and exhausting air at another location;

(b) a plurality of liquid contact plates in each of a series of vertically spaced horizontal tiers and positioned within the housing so as to permit air to contact liquid flowing through said plates while said liquid trickles downwardly from the upper to the lower of said tiers;

(c) said liquid contact plates being constructed and arranged so that the sides of each liquid contact plate are in substantially abutting relation with the sides of all adjoining liquid contact plates and are detachably secured thereto by snap fitted connecting means formed integral with the respective sides of the liquid contact plates in such abutting relationship; and

(d) wherein each of the sides of said liquid contact plates are formed with a right angle cross sectional shape with respective vertical and horizontal leg portions, and support means on each of said sides adapted to engage and support the vertical leg portion of an abutting side of another liquid contact plate, and securing means extending from one abutting side engaging holes in the other abutting side in a snap fit relation.

4,996,009

PREPARATION OF CARBON MICROBALLOONS

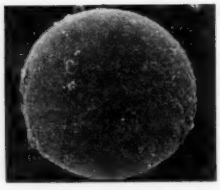
Kazuhiro Hasegawa, Chiba, Japan, assignor to Kawasaki Steel Corporation, Kobe, Japan

Continuation-in-part of Ser. No. 256,073, Oct. 7, 1988, abandoned, which is a continuation of Ser. No. 22,525, Mar. 9, 1987, abandoned, which is a continuation of Ser. No. 748,613, Jun. 25, 1985, abandoned. This application Feb. 8, 1989, Ser. No. 307,614

Claims priority, application Japan, Jun. 26, 1984, 59-131767

Int. Cl.[5] C01B *31/02;* B29B *9/10*

U.S. Cl. 264—5 4 Claims



100μ(=1.2cm)

1. Process for preparing carbon microballoons, consisting of the steps of:

admixing a pitch with a low-boiling organic solvent to form a pitch-solvent mixture in which the solvent is present in an amount of 0.5 to 20% by weight;

said pitch containing 40 to 65% by weight of BI (benzene insoluble) components and up to 0.1% by weight of QI (quinoline insoluble) components. and having a softening point in the range of 60° to 320° C.;

forming said pitch-solvent mixture containing 0.5 to 20% by weight solvent into irregularly-shaped particles having a granulometry comprised between 4 mesh (4,760 μm) and 425 mesh (32 μm);

flash heating said irregularly-shaped particles containing 0.5 to 20% by weight solvent at a temperature higher than the boiling point of said low-boiling organic solvent but below said softening point to cause foaming, whereby expansion pressure of said solvent and surface tension of said particles coact to form hollow, spherical pitch microballoons;

treating said microballoons with an oxidizing gas or liquid to make them infusible; and

sintering the infusible microballoons in a non-oxidizing atmosphere for carbonization.

4,996,010

METHODS AND APPARATUS FOR PRODUCTION OF THREE-DIMENSIONAL OBJECTS BY STEREOLITHOGRAPHY

Borzo Modrek, Azusa, Calif., assignor to 3D Systems, Inc., Valencia, Calif.

Filed Apr. 18, 1988, Ser. No. 183,016

Int. Cl.[5] B29C *35/08*

U.S. Cl. 264—22 17 Claims

1. A method for forming a three-dimensional object from a medium capable of selective physical transformation upon

exposure to synergistic stimulation, comprising the following steps:

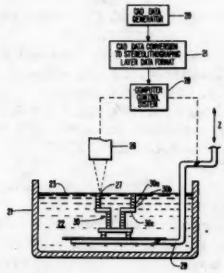
selectively exposing said medium to first synergistic stimulation whereupon said medium selectively transforms into a preliminary object comprising a substantially closed surface of substantially transformed medium surrounding at least enclosed medium that is not substantially transformed;

generally surrounding said substantially closed surface by a substance which conducts heat away from said surface; and

exposing said preliminary object to second synergistic stimulation while the surface is generally surrounded by said substance whereupon said enclosed medium is substantially transformed.

12. An apparatus for forming a three-dimensional object from a medium capable of selective physical transformation upon exposure to synergistic stimulation, comprising:

at least one computer programmed to form a building representation of the object which deviates from a corresponding object representation by inclusion of a deviation specifying a substantially closed surface of substantially transformed medium surrounding at least enclosed medium that is not substantially transformed;



means coupled to said at least one computer for receiving said building representation and for selectively exposing said medium to first synergistic stimulation according to said building representation whereupon said medium selectively transforms into a preliminary object comprising said substantially closed surface of substantially transformed medium surrounding at least said enclosed medium that is not substantially transformed;

means for generally surrounding said substantially closed surface by a substance which conducts heat away from said surface; and

means for exposing said preliminary object to second synergistic stimulation while the surface is generally surrounded by said substance whereupon said enclosed medium is substantially transformed.

4,996,011

PRODUCTION OF POLYETHYLENE MATERIALS HAVING IMPROVED STRENGTH AND MODULUS QUALITIES

Akira Sano, Kawasaki; Hirofumi Kamiishi, Yokohama, and Kazuo Matsuura, Tokyo, all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Filed Jul. 3, 1989, Ser. No. 374,981

Claims priority, application Japan, Jul. 9, 1988, 63-171195

Int. Cl.[5] B29C *35/02*

U.S. Cl. 264—28 **15 Claims**

1. A process for producing polyethylene materials of high mechanical strength and high elastic modulus, which comprises compressing particulate polyethylene of ultrahigh molecular weight at a temperature lower than the melting point thereof, extruding or rolling the compressed polyethylene while in a solid phase to form a molded product, and subsequently stretching the molded product, said particulate polyethylene having an intrinsic viscosity of from 5 to 50 dl/g at 135° C. in decalin and being prepared by a reaction process that includes at least the following two stages of polymerization:

(a) a first stage wherein ethylene is polymerized in a reactor in the presence of a composite catalyst comprising a solid component containing magnesium and titanium or magnesium and vanadium and an organometallic compound and in the presence of hydrogen, to form from 0.1 to 15 parts by weight of an ethylene polymer having an intrinsic viscosity of from 0.1 to 2 dl/g at 135° C. in decalin; and

(b) a second stage wherein fresh ethylene is polymerized in the same reactor containing the catalyst and in the presence of hydrogen at a concentration of from 0 to one lower than in the first stage to form from 85 to 95.9 parts by weight of an ethylene polymer having an intrinsic viscosity of from 8 to 50 dl/g at 135° C. in decalin.

4,996,012

PROCESS AND SYSTEM FOR MOLDING SOLES ON TO SHOE UPPERS

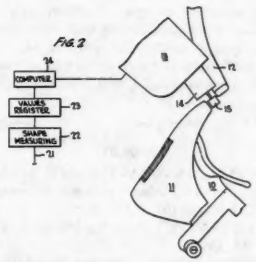
Fritz Gierschewski; Claus D. Koster, both of Bremen, and Joachim Lühr, Schwarme, all of Fed. Rep. of Germany, assignors to Klöckner Ferromatik Desma GmbH, Malterdingen, Fed. Rep. of Germany

Filed May 4, 1989, Ser. No. 347,005

Claims priority, application Fed. Rep. of Germany, May 4, 1988, 3815013

Int. Cl.[5] B29C *37/02, 45/76;* **A43B** *119/00*

U.S. Cl. 264—40.1 **14 Claims**



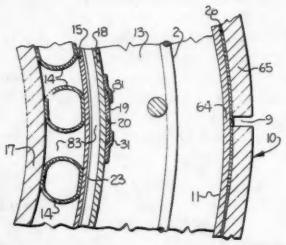
1. A process for molding soles onto last supported shoe uppers, comprising the steps of: providing a shoe molding apparatus at each of a plurality of equally spaced apart shoe molding stations on a circular turntable installation, each said apparatus comprising a last supported shoe upper, a movable bottom stamp, and a mold cavity delimited by the bottom stamp and a pair of opposing lateral side mold elements closed against the periphery of the shoe upper; measuring, at one of said stations, the peripheral curvature of a first shoe upper having a predetermined shape by determining and storing a curved line of spatial coordinates and angles of curvature starting at a first preselected null point at the first shoe upper in the region of the lateral side mold elements; incrementally rotating the turntable for positioning another last supported shoe upper, having a different shape, at said one station; scanning, at said one station, selected points at the periphery of the other shoe upper, in the region of the side mold elements, for comparing the selected points to the stored spatial coordinates and angles of curvature and adapting any deviation therefrom to a second preselected null point; processing the shoe upper by guiding a tool along the curved line starting at the second null point, and injection molding low viscosity material into the mold cavity for molding a sole on to the shoe upper.

4,996,013

METHOD FOR RAPID MOLDING OF ELONGATE CONCRETE ARTICLES

Graeme R. Hume, 29 Clark Road, Ivanhoe, Victoria, Australia

Continuation-in-part of Ser. No. 44,846, May 14, 1987, abandoned. This application Feb. 16, 1989, Ser. No. 311,593
Claims priority, application Australia, Jun. 18, 1985, 1089
Int. Cl.[5] B28B *1/26, 7/32, 21/08, 21/20*
U.S. Cl. 264—86 5 Claims



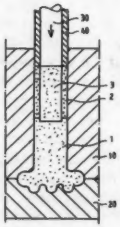
1. A method for forming an elongate molded hollow article made from concrete and comprising the sequential steps of forming a mold defining an inner and an outer surface corresponding to opposed surfaces of the molded article formed therein, said mold being arranged whereby said inner surface is movable relative to said outer surface, filling said mold with concrete, compressing the concrete by movement of said inner surface relatively towards said outer surface to remove surplus liquid from the concrete such that the concrete is given the characteristic of being at least partially cured, maintaining said compression and applying inward pressure over the outer surface of the concrete to remove surplus surface liquid from the outer surface while maintaining said compression, releasing said outer surface pressure and moving said inner surface relatively away from said outer surface to release the molded hollow article from said mold, and separating said mold from the molded hollow article.

4,996,014

METHOD FOR MANUFACTURE OF SPIKE RIVITS

Erkki Suvanto, Porvoo, Finland, assignor to Neste Oy, Finland

PCT No. PCT/FI89/00167, § 371 Date Apr. 12, 1990, § 102(e) Date Apr. 12, 1990, PCT Pub. No. WO90/02619, PCT Pub. Date Mar. 22, 1990
PCT Filed Sep. 5, 1989, Ser. No. 469,489
Claims priority, application Finland, Sep. 7, 1988, 884122
Int. Cl.[5] B29C *43/20, 43/14;* B32B *1/10*
U.S. Cl. 264—113 11 Claims



1. A method for the manufacture of a rivet for a fixed spike or for a sleeve-mounted spike, respectively, by pressing in a mold, said method comprising the following steps:

the cavity space in the mold, corresponding to the shape of the spike to be manufactured, is filled to the desired extent with a first material to form the body part of the spike,

a first punch, whose diameter is substantially smaller than the diameter of the cavity space in the mold, is fitted into the cavity space concentrically with the cavity space, and the annular space between said first punch and the cavity space is filled with a second material so as to form the wear-resistant surface layer for the spike,

the first punch is removed, and the space remaining after said punch is removed is filled with a third material,

the spike is pressed to the desired shape and density, whereinafter the spike is removed from the mold,

after the second material, which forms the surface layer, has been fitted into the mold, an intermediate pressing is carried out to compact at least said second material and the intermediate pressing is carried out by pressing by means of the first and a second punch, at the same time.

4,996,015

METHODS OF PRODUCING CERAMIC HONEYCOMB STRUCTURES

Masafumi Yoshimoto, Sakai; Tadao Nakatsuji, Kashibacho, and Noriaki Sato, Takaishi, all of Japan, assignors to Sakai Chemical Industry Co., Ltd., Osaka, Japan

Filed May 16, 1989, Ser. No. 353,328
Claims priority, application Japan, May 20, 1988, 63-124756
Int. Cl.[5] B29C *47/00*
U.S. Cl. 264—177.11 4 Claims

1. A method of producing ceramic honeycomb structures which comprises:

(a) preparing a ceramic plastic composition which comprises admixing and kneading a ceramic material and an organic binder with water in amounts of about 85–50% by weight and a polyalkylene glycol monoether selected from the group consisting of diethylene glycol monoether and triethylene glycol monoether in amounts of about 15–50% by weight based on the total of the water and the polyalkylene glycol monoether, respectively;

(b) extruding the ceramic plastic composition into a wet green mold of a honeycomb structure having openings extending therethrough;

(c) passing air having a relative humidity of 90–70% and a temperature of about 10° to 40° C. through the openings at a velocity of not less than about one meter per second to evaporate a substantial amount of the water in the green mold;

(d) passing air having a temperature of about 60°–150° C. through the openings at a velocity of not less than about one meter per second to evaporate the polyalkylene glycol monoether from the green mold to provide a dried mold; and

(e) calcining the dried mold.

4,996,016

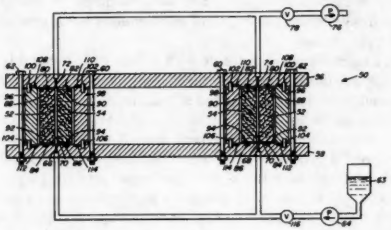
METHODS FOR MAKING REINFORCED COMPOSITE FLYWHEELS AND SHAFTS

W. Alan Walls; Elvin Estes; Steve M. Manifold; Michael L. Spann, and John H. Gully, all of Austin, Tex., assignors to Board of Regents University of Texas System, Austin, Tex.

Filed Dec. 7, 1988, Ser. No. 281,188
Int. Cl.[5] B29C *43/20, 43/36;* B32B *31/06*
U.S. Cl. 264—229 15 Claims

1. A method of forming an assembly of an annulus and a cylinder disposed in said annulus in which the annulus and cylinder are radially prestressed, said method comprising the steps of placing the cylinder within said annulus to define an interface between the annulus and the cylinder, injecting a

bonding agent under pressure into the interface between the annulus and the cylinder, said bonding agent thereafter solidifying, and maintaining the bonding agent under pressure while the bonding agent solidifies.



4,996,017

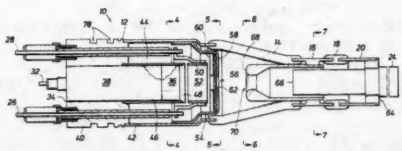
NEUTRON GENERATOR TUBE

D. Ray Ethridge, Houston, Tex., assignor to Halliburton Logging Services Inc., Houston, Tex.

Continuation of Ser. No. 353,832, Mar. 1, 1982, abandoned. This application May 3, 1985, Ser. No. 730,254

Int. Cl.[5] G21B *1/02*

U.S. Cl. 376—116 **12 Claims**



1. A neutron generator tube comprising:

(a) a hermetically sealed housing containing an ionizable gas;

(b) an axial recess in one end of said housing adapted to receive a magnet;

(c) a ring anode axially oriented within said housing adjacent to said recessed end for accepting said magnet;

(d) an axially oriented thermal conductor cathode penetrating through the other end of said housing wherein the inner surface of said cathode contains a target;

(e) an ion screen ensemble near said anode ring and between said anode ring and cathode target wherein said ion screen ensemble contains an axially positioned gridded aperture wherein said aperture is substantially smaller than said anode ring and target and wherein said ion screen ensemble further comprises:

(i) a highly polished thin-walled cover on the cathode side,

(ii) a magnetic metal disc on the anode side, and

(iii) a thin metal grid sandwiched between said cover and disc such that an electrical potential may be externally superimposed on said ion screen ensemble and be varied relative to the potentials of said ring anode and cathode such as to assist in the extraction of ions from the ion source; and

(f) an electron shield near said cathode target and between said ion screen ensemble and cathode target wherein said electron shield contains an axially positioned aperture.

4,996,018

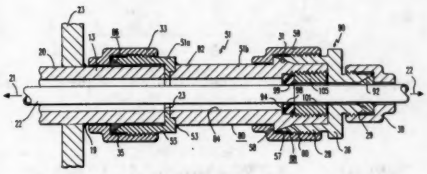
HIGH PRESSURE THIMBLE/GUIDE TUBE SEAL FITTING WITH BUILT-IN LOW PRESSURE SEAL ESPECIALLY SUITABLE FOR FACILITATED AND MORE EFFICIENT NUCLEAR REACTOR REFUELING SERVICE

Pankaj N. Bhatt, Plum Boro, and Ronald M. Blaushild, Export, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 19, 1989, Ser. No. 340,187

Int. Cl.[5] G21C *13/00*

U.S. Cl. 376—203 **7 Claims**



1. A HP/LP seal arrangement for an elongated guide tube and an elongated thimble disposed therein, said guide tube and thimble extending outwardly from the core of a nuclear reactor to a seal table where said guide tube is welded to the seal table to provide a high pressure seal relative thereto, said seal arrangement comprising:

a tubular seal fitting disposed in alignment with said guide tube with said thimble extending therethrough on the low pressure side of the seal table;

first high pressure sealing means coupling one end of said fitting to an end of said guide tube to prevent leakage from within said guide tube;

inwardly facing thread means disposed adjacent the other and outer end of said seal fitting;

a nut having an opening through which said thimble extends and further having outwardly facing threading in mating engagement with said fitting thread means;

said fitting having a seal seat spaced longitudinally inwardly from said thread means and facing said fitting outer end and further disposed annularly about the inner surface of said fitting;

deformable ring seal means disposed about said thimble and between said nut and said fitting seal seat and having respective surfaces in engagement with the radially outwardly facing surface of said thimble, the radially inwardly facing surface of said fitting and said fitting seal seat to provide a low pressure seal between said fitting and said thimble; and

second releasable high pressure sealing means coupling said thimble to the outer end portion of said guide tube.

4,996,019

STORAGE CONTAINER FOR RADIOACTIVE WASTE

Louis Catalayoud, Cherbourg, and Michel Gerard, Tourlaville, both of France, assignors to Cogema Compagnie Generale des Matieres Nucleaires, Velizy Villacoublay, France

Filed Dec. 11, 1989, Ser. No. 448,553

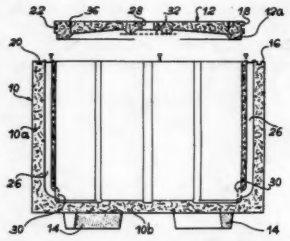
Claims priority, application France, Dec. 12, 1988, 88 16337; Jun. 16, 1989, 89 08050

Int. Cl.[5] G21C *19/00*

U.S. Cl. 376—272 **20 Claims**

1. A storage container for radioactive waste comprising a drum provided with an opening for introducing the waste and a cover for tightly sealing said opening, said container being totally made from concrete reinforced by metal fibers, said container including a junction zone between the cover and the drum, said junction zone having, around said opening, at least one keying groove, said container also having at least one

filling passage by which metal fiber-reinforced concrete can be injected around waste contained in the container wherein the



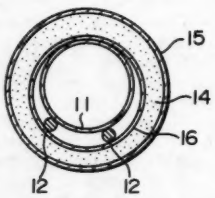
filling passage is formed within a side wall of the drum and issues in the vicinity of the bottom of the latter.

4,996,020

A SYSTEM FOR RESTRAINING DIFFUSION OF TRITIUM

Shigehiro Shimoyashiki, and Ryuhei Kawabe, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 15, 1989, Ser. No. 409,589
Claims priority, application Japan, Sep. 21, 1988, 63-235027
Int. Cl.[5] G21C *19/42*
U.S. Cl. 376—313 8 Claims



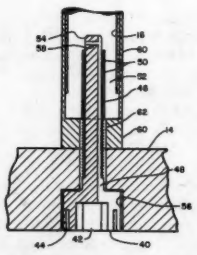
1. A system for restraining diffusion of tritium, comprising a heat reserving means which is mounted to a device of a fast breeder reactor and which includes a hydrogen-absorbing metal.

4,996,021

BOTTOM NOZZLE TO GUIDE TUBE CONNECTION

William J. Bryan, Granby, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed May 29, 1990, Ser. No. 529,406
Int. Cl.[5] G21C *3/32*
U.S. Cl. 376—446 9 Claims



1. In a nuclear fuel assembly which includes an upper end fitting and a lower end fitting spaced therefrom and connected thereto by a plurality of elongated guide tubes of one alloy having an open upper end and a closed lower end with spaced fuel element retaining grids mounted on the guide tubes therebetween, the closed lower ends of said guide tubes including a threaded central passageway and the attachment of said guide tubes to said lower end fitting of another alloy being characterized by:

an externally threaded bolt with a first end threadably received in said threaded central passageway of the lower end of said guide tube and a head at the other end on the side of the lower end fitting opposite said guide tube;

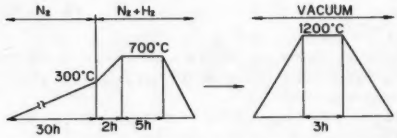
an interruption in the external threads of said bolt which forms a groove which communicates the interior of the guide tube with the side of the lower end fitting opposite said guide tube and enhances its frictional engagement with said threaded central passageway, thereby to hold and attach said guide tube and lower end fitting firmly together, even through a series of temperature cycles.

4,996,022

PROCESS FOR PRODUCING A SINTERED BODY

Norikazu Shindo; Tomoyuki Sekine, both of Chofu; Yoshikatsu Nakamura, Omiya, and Takashi Kawamoto, Urawa, all of Japan, assignors to Juki Corporation and Nippon Piston Ring Co., Ltd., both of Tokyo, Japan

Filed Jul. 10, 1990, Ser. No. 550,972
Claims priority, application Japan, Jul. 14, 1989, 1-181748; Jul. 14, 1989, 1-181749
Int. Cl.[5] B22F *1/00*
U.S. Cl. 419—2 13 Claims



1. In a process for producing a sintered body comprising the steps of mixing one or more metal powder particles with an organic binder, injection-molding the mixture to form a green body of a predetermined shape, removing the binder from the green body to form a porous body substantially composed of the metal powder, and heating the porous body to a sintering temperature and holding it at that temperature to produce a sintered body, the improvement wherein the binder is removed through the sequence of the following steps: preheating the green body in an inert gas atmosphere in a temperature range that creates open pores in it; placing the green body, in which open pores have started to form, in a hydrogen gas atmosphere optionally mixed with an inert gas; holding the green body in a temperature range where the metal powder is not carburized and where the open pores will be maintained, so that the greater part of the binder is removed to form a porous body that is substantially made of the metal powder alone; and further holding said porous body at said heating temperature for a sufficient period of time to vaporize the carbon in the small amount of residual binder in the porous body through reaction with hydrogen.

4,996,023

METHOD OF MANUFACTURING A PERMANENT MAGNET

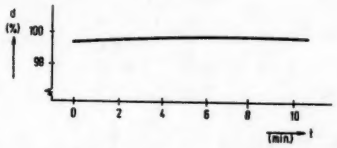
Abraham R. Flipse; Peter J. Kay, both of Eindhoven, Netherlands, and Ewoud Rozendaal, Southport, Great Britain, assignors to U.S. Philips Corp., New York, N.Y.

Filed Oct. 16, 1989, Ser. No. 421,863

Claims priority, application Netherlands, Oct. 17, 1988, 8802543

Int. Cl.[5] B22F *1/00*

U.S. Cl. 419—12 8 Claims



1. A method of manufacturing a permanent magnet which comprises a hard magnetic material having a tetragonal phase of the $RE_2Fe_{14}B$ type, wherein RE is at least one element selected from the group consisting of the rare earth metals having atomic number 57 up to and including 71 and Yttrium, the method comprising the following steps

(a) forming an alloy comprising 8–30 at. % RE, 2–28 at. % B and 42–90 at. % Fe

(b) pulverizing the alloy into a powder

(c) compressing the powder, into a shaped body, and

(d) sintering the shaped body in the temperature range from 900°–1200° C., wherein the shaped body is sintered to at least 95% of the theoretical maximum density by means of induction heating in a single sintering treatment.

4,996,024

METHOD FOR CASTING POWDER

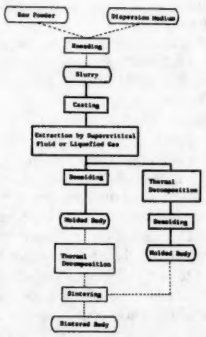
Hiroaki Nishio, and Akira Kato, both of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Aug. 14, 1989, Ser. No. 393,622

Claims priority, application Japan, Sep. 2, 1988, 63-218300

Int. Cl.[5] B22F *1/00*

U.S. Cl. 419—40 6 Claims



1. A method for casting a metal or ceramic powder which comprises casting a slurry of the metal or ceramic powder suspended in a dispersion medium containing at least 10 wt. of a liquid extractable with a supercritical fluid or a liquefied gas and excluding a binder into a porous mold, keeping the slurry placed in the porous mold at a temperature not lower than the melting point of the dispersion medium, and extracting at least 10 wt. % of the dispersion medium with the supercritical fluid or liquefied gas to impart a formability to the extracted body.

4,996,025

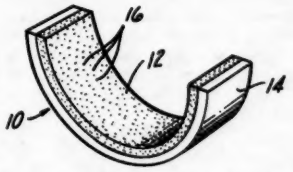
ENGINE BEARING ALLOY COMPOSITION AND METHOD OF MAKING SAME

George C. Pratt, Ann Arbor, and Warren J. Whitney, Jr., Ypsilanti, both of Mich., assignors to Federal-Mogul Corporation, Southfield, Mich.

Filed Jan. 23, 1986, Ser. No. 821,716

Int. Cl.[5] C22C *21/00*

U.S. Cl. 420—554 3 Claims



1. An aluminum-lead bearing alloy with a lead content ranging from about 4.0% by weight to about 15% by weight in which the lead phase consists of uniformly distributed spherical particles less than 10 microns in diameter and predominantly 1 to 5 microns in diameter, and wherein the content of any other constituents totals not more than 10% by weight.

4,996,026

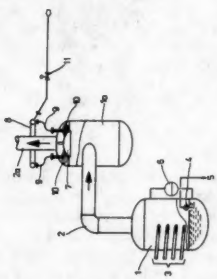
SEPARATION SYSTEM AND REDUCING THE EMISSION OF SOLIDS IN PRESSURE RELIEF PROCESSES IN HIGH PRESSURE POLYMERIZATION REACTORS

Friedrich Kanne, 3 Antoniusstrasse, 5047 Wesseling; Klaus Pfleger, 6 Otto-Strasse, 5047 Wesseling; Hans Glomb, 22 Ulmenstrasse, 5047 Wesseling; Gerhard Arnold, 4 Weissdornweg, 5047 Wesseling; Klaus Boettcher, 5 Antoniusstrasse, 5047 Wesseling, and Siegfried Kursawe, 4 Fasanenweg, 5047 Wesseling, all of Fed. Rep. of Germany

Continuation of Ser. No. 104,228, Oct. 5, 1987, abandoned. This application Mar. 24, 1989, Ser. No. 328,791

Int. Cl.[5] C08F *2/00*

U.S. Cl. 422—106 8 Claims



1. An apparatus for reducing the emission of solids during pressure relief processes of reaction mixtures present in tube reactors or autoclaves used for the polymerization of ethylene or copolymerization of ethylene with ethylenically unsaturated comonomers in the presence of an initiator under 500 to 4,000 bar and from 150° to 350° C. comprising:

a first separating container and at least one additional downstream separating container arranged in series,

inlet means through which the reaction mixture let down is fed into the first separating container, said inlet means

tangentially entering the side of said first separating container and directed downward,

valve means for maintaining a constant water level in said first separating container,

connection pipe means located at the top of said first separating container and passing to said additional downstream separating container, said connecting means entering the side of said downstream separating container laterally and tangentially,

outlet means located at the top of said additional separating container,

dish shaped baffle means located at the top of said additional separating container and upstream of said outlet means, the diameter of said baffle means being smaller than the diameter of said additional separating container, and

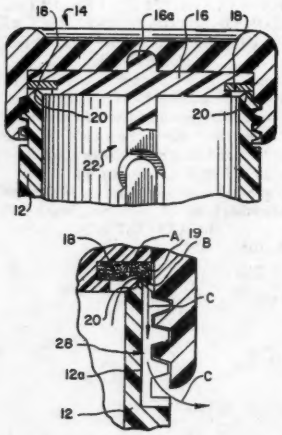
at least four nozzle means for producing a water film, said nozzle means entering the top of said additional separating container and located between the edge of said baffle means and the inner walls of said additional separating container.

4,996,027

CONTACT LENS CASE HAVING PRESSURE VENTING GASKET

Rowland W. Kanner, Guntersville, Ala., assignor to Ciba Vision Corporation, Atlanta, Ga.

Filed Apr. 7, 1989, Ser. No. 334,940
Int. Cl.[5] A61J *1/00;* **G05G** *15/00*
U.S. Cl. 422—113 **20 Claims**



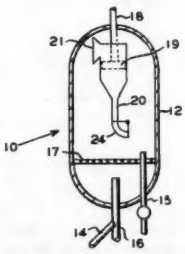
13. An appliance for containing and venting fluid, comprising: a container body including an opening; closure means for closing said opening; an self-reseating, unitary gasket means disposed to form a normally tight seal between said container body and said closure means wherein said self-reseating, unitary gasket means comprises a composition sufficiently resilient to at least partially unseat from said container body while an engaged surface of said cap means remains stationary upon said container body upon exertion against said self-reseating, unitary gasket means of fluid pressure within said container body, so that said pressurized fluid is vented past said unseated gasket means which forms a vent passageway between said closure means and said container body, after which said self-reseating, unitary gasket means deflects to reseat and seal against said container body in order to prevent any subsequent leakage of fluid therefrom.

4,996,028

TRICKLE VALVE

Arvid M. Danielsen, Sparta, and Donald F. Shaw, Denville, both of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Feb. 15, 1989, Ser. No. 310,985
Int. Cl.[5] F27B *15/02;* **F16K** *15/03*
U.S. Cl. 422—147 **9 Claims**



5. In a fluid solids contacting apparatus having at least one cyclone in the apparatus for gas-solids separation and including a trickle valve operatively connected to the dipleg of the cyclone for stabilizing the level of solids therein, the improvement wherein the trickle valve comprises:

a curved tubular body having a first end connected to the cyclone and a second end defining a valve seat, the tubular body having a diameter, D, and a radius of curvature in the range of from about 1½ times to 2½ times the diameter, D, of the tubular body;

a flapper plate having two faces; and

means for pivotably mounting the flapper plate for one of the two faces to engage the valve seat when the valve is in a closed position and to disengage and move away from the valve seat when the valve is in an open position.

4,996,029

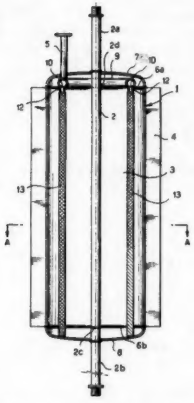
HEAT-EXCHANGER REACTOR

Frédéric Martin, Creteil, and Georges Crozat, Perpignan, both of France, assignors to Faiveley Entreprises, Saint-Ouen, France

PCT No. PCT/FR88/00257, § 371 Date Jan. 17, 1989, § 102(e) Date Jan. 17, 1989, PCT Pub. No. WO88/09469, PCT Pub. Date Dec. 1, 1988
PCT Filed May 20, 1988, Ser. No. 314,069
Claims priority, application France, May 22, 1987, 87 07211
Int. Cl.[5] B01J *8/02;* **F28D** *7/10*
U.S. Cl. 422—188 **3 Claims**

1. A heat-exchanger reactor comprising a cylindrical metal containment for receiving a solid chemical substance, this containment having passing axially through it a metal tube for the circulation of a heat-exchange fluid, the tube and an interior of the cylindrical containment being in heat exchange relation with each other, wherein the tube has first radial fins each extending substantially over the entire height of the cylindrical containment and extending over the entire radial distance between the tube and an inner surface of the cylindrical containment, an outer surface of the cylindrical containment having second radial fins each extending substantially over the entire height of said cylindrical containment, and the assembly composed of the cylindrical containment including said first radial fins and the tube including said second fins being a one-piece unit, opposite ends of the cylindrical containment being each closed by an end flange welded to said ends, and between one of said end flanges of the cylindrical containment and an adjacent end of said first radial fins of the tube there being a toroidal hollow body centered on an axis of the tube, a

fluid delivery pipeline opening into said hollow body, and said hollow body having a series of orifices uniformly distributed



around the tube and each arranged opposite a respective one of compartments delimited by the first radial fins of the tube.

4,996,030

METHOD FOR CLEANING EXHAUST GASES

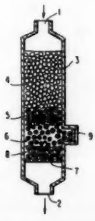
Koichi Kitahara; Takashi Shimada; Noboru Akita; Tadashi Hiramoto, and Kohhei Sasaki, all of Kanagawa, Japan, assignors to Japan Pionics, Ltd., Tokyo, Japan

Filed Jun. 1, 1988, Ser. No. 200,886

Claims priority, application Japan, Jun. 1, 1987, 62-134932; Jun. 1, 1987, 62-134931

Int. Cl.[5] B01D *53/34*

U.S. Cl. 423—210 **6 Claims**



1. A method for cleaning an exhaust gas comprising a base gas and at least one toxic component selected from the group consisting of arsine, phosphine, diborane and hydrogen selenide, which comprises contacting the exhaust gas at an inlet exhaust gas temperature between −20° and 40° C. with a molded cleaning agent having a composition consisting essentially of (1) cupric oxide, (2) manganese dioxide, and (3) at least one metal oxide selected from the group consisting of silicon oxide, aluminum oxide and zinc oxide and having a density of from 0.6 to 1.5 g/ml, said composition having a metal atomic ratio M/(M+Cu +Mn) in the range of from 0.03 to 0.55 and a metal atomic ratio Cu/(Cu+Mn) in the range of from 0.2 to 0.8, wherein Cu represents a number of gram atom of copper; Mn represents a number of gram atom of manganese; and M represents a total number of gram atom of silicon, aluminum and/or zinc, to remove the toxic component from the exhaust gas.

4,996,031

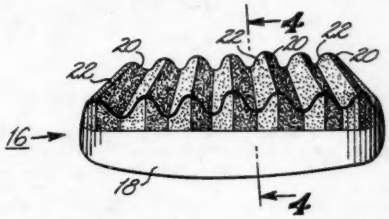
CATALYST SUPPORT MATERIAL CONTAINING LANTHANIDES

James P. Spooner, Willow Grove, Pa., and Alvin B. Stiles, Wilmington, Del., assignors to Rhone-Poulenc Inc., Monmouth Junction, N.J.

Division of Ser. No. 136,279, Dec. 22, 1987, Pat. No. 4,868,150. This application Sep. 15, 1989, Ser. No. 407,931

Int. Cl.[5] B01D *53/36*

U.S. Cl. 423—213.2 **20 Claims**



1. A method of oxidizing or reducing gases comprising contacting said gases at an elevated temperature of about 100° C. to about 1300° C. with a catalyst support material comprising a plurality of stable, highly porous, co-precipitated microcrystallite particulates consisting essentially of an integral admixture of alumina and at least one lanthanide oxide, wherein said lanthanide oxide comprises at least 1% cerium oxide, and wherein about 20 to 30% of the pores have a pore diameter within the range of about 200 to 400 Angstroms.

4,996,032

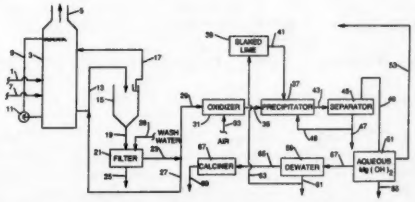
PROCESS FOR REMOVING SULFUR DIOXIDE FROM FLUE GASES

Donald H. Stowe, Jr., Beaver, and Lewis B. Benson, Coraopolis, both of Pa., assignors to Dravo Lime Company, Pittsburgh, Pa.

Filed Dec. 21, 1989, Ser. No. 454,271

Int. Cl.[5] C01B *17/00*; C01F *1/00, 5/14, 11/02*

U.S. Cl. 423—242 **11 Claims**



1. In a process for removing sulfur dioxide from flue gases in a wet scrubber, wherein an aqueous slurry formed from calcium hydroxide and magnesium hydroxide is contacted in said wet scrubber with said flue gases, and said slurry, after said contact, contains calcium sulfite solids and dissolved magnesium sulfite, and is discharged from said wet scrubber and passed to a thickener wherein a thickened aqueous sludge containing calcium sulfite solids is separated from an overflow liquor, the improvement comprising:

returning at least a portion of the overflow liquor to the wet scrubber;

concentrating said thickened aqueous sludge by removal of a sulfite solution, comprising water containing dissolved magnesium sulfite, therefrom;

returning a first portion of said sulfite solution to said thickener;

oxidizing magnesium sulfite in a second portion of said sulfite solution to form a sulfate solution containing magnesium sulfate;

adding lime to said sulfate solution following said oxidation, to precipitate calcium sulfate and form an aqueous magnesium hydroxide suspension; and

separating precipitated calcium sulfate from said aqueous magnesium hydroxide suspension.

4,996,033

CATALYTIC METHOD FOR CONCENTRATING ISOTOPES

Ralph A. Gardner-Chavis, Cleveland, and Michael P. May, North Canton, both of Ohio, assignors to Molecular Technology Corporation, Canton and JC Technology, Inc., Dover, both of, Ohio

Continuation of Ser. No. 176,248, Mar. 31, 1988, abandoned. This application Nov. 13, 1989, Ser. No. 434,485

Int. Cl.[5] C01B *4/00, 5/00*

U.S. Cl. 423—249 **46 Claims**

1. A method for concentrating a desired isotrope of a chemical element from a starting admixture comprising the desired isotope and an undesired isotope of the chemical element which comprises:

reacting the starting admixture with one or more reactants in the presence of a catalyst to catalyze a reaction selectively with the desired isotope to form reaction products where the concentration of the desired isotope relative to the concentration of the undesired isotope in the reaction products is at least about two times greater than the concentration of the desired isotope relative to the concentration of the undesired isotope in the starting admixture.

4,996,034

PROCESS FOR PREPARING SILICON SUBSTITUTED ZEOLITE COMPOSITIONS

Gary W. Skeels, Brewster, N.Y., assignor to UOP, Des Plaines, Ill.

Filed Dec. 22, 1989, Ser. No. 455,490

Int. Cl.[5] C01B *33/28*

U.S. Cl. 423—328 **7 Claims**

1. The process for substituting silicon into the crystal lattice of zeolites in place of extracted lattice aluminum atoms to achieve zeolite products of higher silicon content which comprises:

(a) providing a starting aluminosilicate zeolite having a framework SiO_2/Al_2O_3 molar ratio of at least 2 and pore diameters of at least 3 Angstroms;

(b) contacting said starting zeolite at a temperature of 25° C. to 95° C. with an aqueous solution of a fluorosilicate salt containing from 0.5 to 1.5 moles per liter of said fluorosilicate salt dissolved therein, the proportions of zeolite and fluorosilicate salt being at least 0.1 moles of salt per 100 grams of anhydrous zeolite;

(c) maintaining contact between the zeolite and the salt solution for a period not in excess of 5 hours;

(d) removing from contact with the zeolite the liquid medium containing at least 90 percent of the by-product fluoroaluminate salt produced by the reaction of the fluorosilicate salt with the zeolite.

4,996,035

PREPARATION OF NITROSYL FLUORIDE

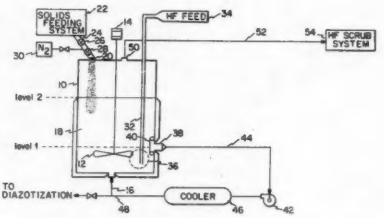
Nickolas J. Stepaniuk, Chesterfield, and Bruce J. Lamb, St. Charles, both of Mo., assignors to Mallinckrodt, Inc., St. Louis, Mo.

Continuation-in-part of Ser. No. 316,024, Feb. 27, 1989, Pat. No. 4,908,270. This application Feb. 5, 1990, Ser. No. 474,905

The portion of the term of this patent subsequent to Mar. 13, 2007, has been disclaimed.

Int. Cl.[5] C01B *21/083*

U.S. Cl. 423—386 **12 Claims**



1. A process for the preparation of nitrosyl fluoride, comprising separately introducing and blending nitrite and hydrogen fluoride into nitrosyl fluoride solution so as to form a reaction mixture within which the nitrite and the hydrogen fluoride react so as to produce additional nitrosyl fluoride, wherein said hydrogen fluoride is introduced into said reaction mixture spaced away from where said nitrite is introduced into said reaction mixture so that the hydrogen fluoride and the nitrite independently mix into said nitrosyl fluoride solution and are diluted therein before mixing with each other, thereby avoiding a violent reaction between the hydrogen fluoride and the nitrite.

4,996,036

ABATEMENT OF NO_x FROM HYDROXYLAMINE DISULFONATE PROCESS

William B. Fisher; Lamberto Crescentini, and Laszlo J. Balint, all of Chester, Va., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Dec. 28, 1988, Ser. No. 291,089

Int. Cl.[5] C01B *21/093, 21/20, 21/00*

U.S. Cl. 423—388 **7 Claims**

1. A process for the production of hydroxylamine disulfonate diammonium salt (DS) comprising reacting ammonium nitrite with ammonium bisulfite and sulfur dioxide in an absorption reactor whereby emission gases comprising NO_x, particularly NO, are released as a result of side reactions, the process comprising treating said emission gases to reduce the concentration of NO_X comprising adding NO_2 to the emission gases and contacting the mixture of NO_2 and emission gases with an aqueous alkali solution sufficiently to form nitrite and nitrate ions in said alkali solution, thereby reducing the concentration of NO_x in said emission gas.

4,996,037

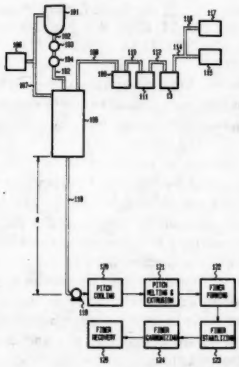
PROCESSES FOR THE MANUFACTURE OF ENRICHED PITCHES AND CARBON FIBERS

Donald C. Berkebile, 2675 Iroquois Ave., Ashland, Ky. 41101; Donald M. Lee, 92 S. Altamont Rd., Huntington, W. Va. 25701; Larry D. Veneziano, 2690 Velma Ct., Simi, Calif. 93065; Joseph J. Lauer, 421 Bellefonte Princess, Ashland, Ky. 41101; Roy E. Booth, P.O. Box 630003, Dallas, Tex. 75265-1003, and William P. Hettinger, 203 Meadowlark Rd., Russell, Ky. 41101

Division of Ser. No. 776,176, Sep. 13, 1985. This application Mar. 12, 1986, Ser. No. 839,231

Int. Cl.[5] D01F *9/145*

U.S. Cl. 423—447.4 20 Claims



1. An improved process for the production of carbon fibers, which process comprises:

(A) treating a petroleum pitch in a system comprising a wiped-film evaporator and a means for recovering enriched pitch to obtain an enriched pitch;

(B) delivering said enriched pitch to the inlet of said means for recovering enriched pitch at a pressure equivalent to a vertical distance between the outlet of said wiped-film evaporator and said inlet of about 10 feet to about 40 feet;

(C) maintaining the wiped-film evaporator at operating conditions that will provide enriched pitch;

(D) melting said enriched pitch to form a melted pitch;

(E) converting said melted pitch into a filament, roving, or mat of pitch fibers;

(F) stabilizing said filament, roving, or mat of pitch fibers by contacting said filament, roving, or mat of pitch fibers with an oxidant at an elevated temperature to form a stabilized product; and

(G) carbonizing said stabilized product by heating it in an inert atmosphere to a temperature within the range of about 900° C. (1,652° F.) to about 3,000° C. (5,432° F.).

4,996,038

HEAT RECOVERY FROM CONCENTRATED SULFURIC ACID

Donald R. McAlister, Ballwin, Mo., and Steven A. Ziebold, Waterloo, Ill., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 669,971, Nov. 9, 1984, Pat. No. 4,670,242, and a continuation-in-part of Ser. No. 510,527, Jul. 5, 1983, Pat. No. 4,576,813. This application Sep. 19, 1986, Ser. No. 909,708

The portion of the term of this patent subsequent to Mar. 18, 2003, has been disclaimed.

Int. Cl.[5] C17B *17/98;* C01B *17/74, 17/48;* C22C *38/40*

U.S. Cl. 423—522 23 Claims

1. In a process for the manufacture of sulfuric acid, comprising the catalytic oxidation of sulfur dioxide to sulfur trioxide, absorption of the sulfur trioxide in sulfuric acid, and cooling the sulfuric acid in a heat exchanger by transfer of heat to another fluid, the improvement which comprises:

contacting a gas comprising sulfur trioxide with sulfuric acid in a primary absorption zone in a heat recovery tower, said sulfuric acid having a concentration between 98% and 101% and a temperature of at least 120° C.; contacting the gas exiting from said primary absorption zone with sulfuric acid in a secondary absorption zone positioned above said primary absorption zone in said heat recovery tower, the inlet temperature of the sulfuric acid to the secondary absorption zone being at least 10° C. cooler than the inlet temperature of the sulfuric acid to the primary absorption zone; and removing said heat of absorption in useful form from the sulfuric acid exiting said primary absorption zone by transfer of heat to another fluid, and thereby heating said another fluid to a temperature greater than 120° C.

4,996,039

PRODUCTION OF HYDROGEN PEROXIDE

Christian Pralus, Saint-Cyr-Au-Mont-D'Or, and Jean-Pierre Schirmann, Oullins, both of France, assignors to Atochem, Puteaux, France

Filed Oct. 12, 1989, Ser. No. 420,514

Claims priority, application France, Oct. 12, 1988, 88 13671

Int. Cl.[5] C01B *15/01*

U.S. Cl. 423—584 11 Claims

1. A process for the production of hydrogen peroxide, comprising (a) intimately contacting a gaseous phase comprising gaseous hydrogen at superatmospheric pressure with an inorganic aqueous reaction medium which comprises a catalytically effective amount of a platinum group metal catalyst, (b) next diminishing the amount of hydrogen in said gaseous phase to a value under the explosive/flammable limits of admixture thereof with the gaseous oxygen introduced in step (c), and (c) intimately contacting said aqueous reaction medium and diminished gaseous phase with a source of gaseous oxygen, the hydrogen contacted with said source of gaseous oxygen being that fraction coexisting with said aqueous medium resulting from step (b), wherein the gaseous phase of hydrogen and oxygen resulting from step (c) is neither flammable nor explosive.

4,996,040

CELLS STAINED WITH A DIAZO DYE

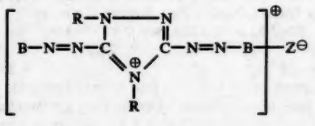
Lawrence Kass, Hinckley, Ohio, assignor to Cytocolor, Inc., Hinckley, Ohio

Continuation-in-part of Ser. No. 148,668, Jan. 26, 1988, Pat. No. 4,853,210, which is a continuation-in-part of Ser. No. 604,741, Apr. 27, 1984, abandoned. This application Jun. 29, 1989, Ser. No. 373,269

Int. Cl.[5] G01N *33/48*

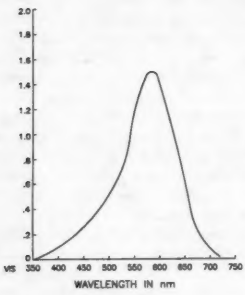
U.S. Cl. 424—3 10 Claims

1. A plurality of cells of hematopoietic origin stained with an effective amount of a water-soluble cationic heterocyclic diazo dye: said stained cells having color characteristics permitting the differentiation, identification, and enumeration of the stained cells among a plurality of cells: said cationic heterocyclic diazo dye having the formula I or II:



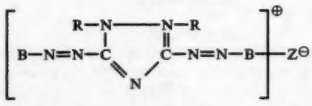
I.

or



-continued

II.



wherein R is a lower alkyl or benzyl radical, $Z\ominus$ is an anion, and B is a radical having the formula:

wherein A is a phenylene radical and R_1 and R_2 are selected from the group consisting of hydrogen and lower alkyl radicals.

4,996,041

METHOD FOR INTRODUCING OXYGEN-17 INTO TISSUE FOR IMAGING IN A MAGNETIC RESONANCE IMAGING SYSTEM

Toshiyuki Arai, 26-46 Nishifukunokawa-cho, Okazaki, Sakyo-ku, Kyoto 606, Japan; Pradeep M. Gupte, 3 Larissa Ct., Tallman, Monsey, N.Y. 10952, and Sigmund E. Lasker, 531 Main St., New York, N.Y. 10044

Filed Aug. 19, 1988, Ser. No. 234,339
Int. Cl.[5] G01N *24/00*; A61B *6/00*
U.S. Cl. 424—9 **13 Claims**

1. A method for the non-invasive and visual estimation of the spacial distribution of $H_2{}^{17}O$ in the tissue of a subject, said method comprising administering to said subject an effective imaging amount of a diagnostic imaging agent comprised of a complex of oxygen-17 and a biologically acceptable liquid carrier, and wherein said complex has an ionic composition essentially equal to that of blood, and an average particle size of less than about 0.6 microns, and measuring the production of $H_2{}^{17}O$ in said tissue by means of a proton magnetic resonance imaging system.

4,996,042

TOOTHPASTE

Helmar R. Wagner, Darmstadt, Fed. Rep. of Germany, assignor to Blendax GmbH, Mainz, Fed. Rep. of Germany

Filed Mar. 6, 1989, Ser. No. 336,156
Int. Cl.[5] A61K *9/16, 9/22*
U.S. Cl. 424—54 **2 Claims**

1. A toothpaste being basically free from compounds releasing calcium ions, characterized by containing a combination of

(a) an anticalculus agent selected from the group consisting of an alkali metal pyrophosphate sufficient to provide about 1% to about 5% pyrophosphate ions based on the total composition, ethane 1-hydroxy-1,-1,-diphosphonic acid or its water soluble salts sufficient to provide about 0.2 to about 2.0% of phosphonic acid based on the total composition and mixtures thereof and

(b) a water-soluble salt of 3-pyridylmethanol in a quantity of 0.05 to 0.5% by weight (calculated on 3-pyridylmethanol), related to total composition.

4,996,043

ADVANCED EQUINE HOOF PREPARATION

Marina Adamich-Saltman, Townsend, Del., assignor to Equus Scientific Labs, Inc., West Coast Office, Woodside, Calif.

Filed Jul. 21, 1986, Ser. No. 889,409
Int. Cl.[5] A61K *7/04, 31/715*
U.S. Cl. 424—61 **20 Claims**

1. A composition for the veterinary prophylaxis and treatment of ungular keratinous tissue to ameliorate dry hoof condition, said composition being an aqueous dispersion consisting essentially of:

(a) 20 to 90 percent by weight of water;

(b) 0.1 to 3 percent by weight of polysaccharide;

(c) 7 to 79.1 percent by weight of triglyceride;

(d) at least 30 percent by weight of the fatty acid of said triglyceride is oleic acid, and the ratio oleic acid:linoleic acid is equal to or greater than 1;

(e) said composition exhibiting properties when applied to keratin-containing non-skin, non-hair ungular tissue of:

(i) a non-sticky surface to reduce adhesion of moisture-absorbing substances such as dirt and sawdust;

(ii) restoring moisture;

(iii) simulating periople moisture barrier;

(iv) aiding in prevention of stress cracks and brittleness

(v) non-drying; and

(vi) not permanently retarding lipid film development; and

(f) whereby application to complex composite ungular keratin-containing tissue structures restores them to and maintains them in a healthy water-balanced condition.

4,996,044

LIPSTICK FORMULATION AND METHOD

Clara G. Mercado, Aberdeen, and Ann M. Krog, Red Bank, both of N.J., assignors to Revlon, Inc., New York, N.Y.

Continuation of Ser. No. 881,162, Jul. 2, 1986, abandoned, which is a continuation of Ser. No. 714,646, Mar. 21, 1985, abandoned. This application Jul. 12, 1989, Ser. No. 378,506
Int. Cl.[5] A61K *7/025*
U.S. Cl. 424—64 **8 Claims**

1. A lipstick formulation comprising 50–70% of a base intermediate, containing by weight of the total composition, 10–14% candelilla wax, 2–6% cetyl alcohol, 1.5–10% ozokerite, 7–20% lanolin alcohol, 0.5–5% beeswax, 3–6% hydrogenated vegetable oil, 1.5–12% petrolatum white, 4–8% lanolin oil, 4–8% mineral oil, and 7–15% oleyl alcohol; 10–35% of a color intermediate, containing by weight of the total composition, 20–30% pigments and castor oil dispersant in a range of 1:4 to 1:1 wherein the pigments are 0.2–0.9% based upon total weight of color intermediate, of organic high staining dyes, and 1–20% based upon total weight of color intermediate of organic dyes; 6–20% by weight of the total composition of castor oil; 1–3% by weight of the total composition of acrylates copolymer dispersant in a range of 1:4 to 4:1; and 0.1–0.8% by weight of the total composition of fragrance.

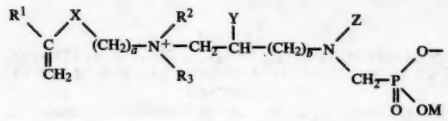
4,996,045

HAIR FIXATIVE COMPOSITIONS CONTAINING ALPHA-AMINOMETHYLENE PHOSPHONATE BETAINES

John Leighton, Flanders, and Carmine Iovine, Bridgewater, both of N.J., assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Filed Nov. 16, 1988, Ser. No. 272,572
Int. Cl.[5] A61K *7/06, 7/11*
U.S. Cl. 424—70 14 Claims

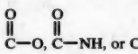
1. A hair fixative composition comprising a solvent and a hydrocarbon propellant and a functional amount of an alpha-aminomethylenephosphonphonate betaine copolymer prepared from at least 5% of a betaine monomer of the formula:



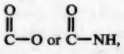
where

R^1 is hydrogen or methyl;

X is



a is 0, 1, 2, or 3, with the condition that when X is



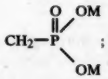
that a be greater than 1;

R^2 and R^3 are independently C_1–C_6 alkyl, aryl, benzyl, or cyclohexyl;

Y is hydrogen or hydroxyl;

b is 0, 1, 2, or 3;

Z is C_1–C_6 alkyl, aryl, benzyl, cyclohexyl, or



and

M is hydrogen, metallic cation, or ammonium ion;

and up to 95% by weight of an ethylenically unsaturated copolymerizable comonomer.

4,996,046

INFRARED TREATMENT FOR PSORIASIS

Thelma G. Warshaw, 519 E. Broad St., Westfield, N.J. 07090, and Jacob Horowitz, 10 Black Birch Rd., Scotch Plains, N.J. 07076

Filed Nov. 24, 1989, Ser. No. 440,675
Int. Cl.[5] A61K *31/74, 7/42*
U.S. Cl. 424—78 6 Claims

1. A method for treating psoriasis which comprises covering the affected area with a material containing an infrared absorbing amount of at least one infrared radiation blocking compound, said amount of said at least one blocking compound being sufficient to substantially reduce the escape of body heat via infrared radiation.

4,996,047

SUSTAINED RELEASE DRUG-RESIN COMPLEXES

William J. Kelleher, Storrs, and Anthony E. Carpanzano, Sherman, both of Conn., assignors to Richardson-Vicks, Inc., Shelton, Conn.

Filed Nov. 2, 1988, Ser. No. 265,910
Int. Cl.[5] A61K *31/74, 9/14, 9/52*
U.S. Cl. 424—79 16 Claims

1. An oral pharmaceutical composition in unit dosage form consisting essentially of irregularly shaped ion-exchange resin particles with an ion-exchange capacity of less than about 6 meq/gram having particle sizes ranging from about 10 to about 500 microns, said particles having a pharmacologically active drug bound thereto wherein said rug comprises more than about 38% by weight of the drug-resin complex, the ratio of pharmacologically-active drug to resin ranging from about 0.5:1 to about 1.5:1 and wherein said drug-resin complex particles have been subsequently coated with from about 1.5% to about 25% by weight of the drug-resin complex of a water-permeable diffusion barrier and wherein said composition provides controlled release of said active drug.

4,996,048

STABILIZING PACKAGED IODOPHOR AND MINIMIZING LEACHING OF IODINE THROUGH PACKAGING

Dileep Bhagwat, Peekskill; Oliver Iny, Little Neck, and Frank Pedi, Jr., Yorktown Heights, all of N.Y., assignors to Euroceltique, S.A., Luxembourg, Luxembourg

Filed Nov. 30, 1988, Ser. No. 278,197
Int. Cl.[5] A61K *31/79;* A01N *59/12;* B65D *81/00;* B29D *23/00*
U.S. Cl. 424—80 14 Claims

1. A stable packaged iodophor solution comprising polyethylene walled container through which walls, iodine from the iodophor solutions containing iodide ions leach in a maximum amount of up to 6.6% according to U.S. Pharmacopeia XXII, said container containing a microbicidal effective iodophor solution containing iodide ions in an amount greater than said U.S. Pharmacopeia maximum amount of 6.6% and sufficient to minimize leaching of iodine from said iodophor solution through the walls of said container.

4,996,049

BIOLOGICAL CONTROL OF CORN SEED ROT AND SEEDLING BLIGHT

Douglas M. Haefele, Newton; Jonathan C. Lamptey, and Joseph L. Marlow, both of West Des Moines, all of Iowa, assignors to Pioneer Hi-Bred International, Inc., Des Moines, Iowa

Filed Dec. 19, 1988, Ser. No. 286,032
Int. Cl.[5] C12R *1/425, 1/39;* A01N *63/00*
U.S. Cl. 424—93 6 Claims

1. A method of protecting corn plants in a growing medium from seed blight and seed rot, comprising:

placing in the growth medium in the immediate vicinity of the corn plant a small but plant protecting effective amount of a bacteria which produces emulsifiers and surfactants that can reduce the surface tension of water in the growing media by at least 40%, which are selected from the group consisting of *Pseudomonas fluorescens* strain 6519E01 having an ATCC accession number of 53860, *Pseudomonas fluorescens* strain 6133D02 having an ATCC accession number of 53859, and *Serratia plymuthica* strain 6109D01 having an ATCC accession number of 53858 and the genetic equivalents thereof which provide effective biological control of pathogens causing corn seed rot and corn seed blight and mixtures of said strains.

4,996,050

FIBRINOLYTIC ACTIVITY ENHANCER

Minoru Tsukada, Osaka; Kenji Tanaka, Nara, and Yoshiro Iga, Osaka, all of Japan, assignors to Green Cross Corporation, Osaka, Japan

Filed Oct. 3, 1988, Ser. No. 252,468
Claims priority, application Japan, Oct. 1, 1987, 62-248937
Int. Cl.[5] A61K *37/547*
U.S. Cl. 424—94.2 12 Claims

1. A fibrinolytic activity enhancer for single-chain pro-urokinase which comprises single-chain pro-urokinase in an amount to provide a dose of approximately 300 to 36,000 UK/kg of body weight (in terms of urokinase) and plasminogen as an active ingredient in an amount effective to enhance the fibrinolytic activity of single-chain pro-urokinase without causing systemic fibrinolysis, and a pharmaceutically acceptable carrier.

4,996,051

LOW CALORIE, HIGH FIBER LAXATIVE

E. Harvey Meer, Cresskill; Frank Mountain, Ridgewood, and Herbert V. Schultz, Jersey City, all of N.J., assignors to Meer Corporation, North Bergen, N.J.

Filed Nov. 23, 1988, Ser. No. 275,714
Int. Cl.[5] A61K *35/78*
U.S. Cl. 424—195.1 14 Claims

1. A natural fiber laxative consisting essentially of:
psyllium husk, apple fiber, fructose, gum arabic and flavorants,
said psyllium husk and said apple fiber constituting together at least 75% by weight of said composition,
said psyllium husk being between 40% to 58% by weight of said composition, and
said apple fiber being between 23% and 40% by weight of said composition.

4,996,052

MICROBIOCIDAL FABRIC HAVING PHOSPHATE DERIVATIVES AND METHOD OF PREPARATION THEREOF

Robert H. McIntosh, Greensboro, N.C., assignor to Interface Research Corporation, Atlanta, Ga.

Division of Ser. No. 47,561, Apr. 27, 1987, which is a continuation-in-part of Ser. No. 781,710, Oct. 2, 1985, Ser. No. 635,728, Jul. 30, 1984, abandoned, Ser. No. 658,695, Oct. 9, 1984, abandoned, Ser. No. 713,445, Mar. 19, 1985, abandoned, Ser. No. 736,652, May 21, 1985, Ser. No. 744,916, Jun. 13, 1985, and Ser. No. 744,730, Jun. 13, 1985, abandoned, each and Ser. No. 635,728, and Ser. No. 658695, and Ser. No. 713,445, and Ser. No. 736,652, and Ser. No. 774,916, and Ser. No. 774,730, is a continuation-in-part of Ser. No. 570,952, Mar. 8, 1984, which is a continuation of Ser. No. 523,734, Aug. 16, 1983, abandoned, which is a continuation of Ser. No. 226,006, Jan. 19, 1981, abandoned, which is a continuation of Ser. No. 930,879, Aug. 4, 1978, abandoned. This application Jan. 31, 1990, Ser. No. 472,743
Int. Cl.[5] A01N *25/34*; A61K *31/14*; C07F *9/02*
U.S. Cl. 424—404 18 Claims

1. A method for preparing a microbiocidal composition comprising the steps of:
(a) reacting phosphorous pentoxide with 3 moles or more of a C_1 to C_{24} hydroxy alkyl, aryl, aralkyl, or alkaryl compound per mole of phosphorous pentoxide at a temperature of between approximately 60° C. and 120° C. to form a phosphoric acid derivative with at least one free hydroxyl group; and
(b) reacting the product of step (a) with between approximately 0.5 and 1.5 moles of a tertiary amine of the formula $N(R_1)_2R_2$, wherein R_1 is a hydroxy alkyl group of from 1 to 18 carbon atoms, and R_2 is an alkyl group of from 8 to 18 carbon atoms.

4,996,053

BAIT FOR CONTROLLING DARKLING BEETLES, LESSER METAL WORMS AND HIDE BEETLES

Richard P. Hatcher, P.O. Box 60, Watkinsville, Ga. 30677

Filed Nov. 22, 1989, Ser. No. 440,200
Int. Cl.[5] A01N *25/08*
U.S. Cl. 424—410 16 Claims

1. An insecticidal composition comprising a mixture of:
from about 55.5% to about 75.5% by weight of a ground cereal grain;
from about 20% to about 40% by weight of powdered boric acid,
from about 1% to about 5% by weight of an edible oil from the class consisting of corn oil and soy cil, and
from about 1% to about 5% by weight of silica gel.

4,996,054

ANTITHROMBOGENIC, NON-CALCIFYING MATERIAL AND METHOD OF MAKING ARTICLES FOR MEDICAL PURPOSES

Hanns Pietsch; Holger Kartheus; Hans-Joachim Holtzmann, all of Hamburg; Günther Sachau, Quickborn, and Helmut Reul, Düren, all of Fed. Rep. of Germany, assignors to Beiersdorf Aktiengesellschaft, Hamburg, Fed. Rep. of Germany

Division of Ser. No. 933,003, Nov. 20, 1986, Pat. No. 4,831,065. This application Oct. 19, 1988, Ser. No. 240,998
Claims priority, application Fed. Rep. of Germany, Nov. 23, 1985, 3541478
Int. Cl.[5] A61F *2/02*
U.S. Cl. 424—422 11 Claims

1. A method of forming a shaped article comprising shaping a composition comprising a polyurethane, a fatty acid ester and, as a cross-linking agent, an alkoxysilyl compound that contains at least two methoxysilyl, ethoxysilyl, propoxysilyl, or butoxysilyl groups and at least one amino group, and thereafter cross-linking the shaped mass through the action of water or humidity.

4,996,055

DEODORIZED BACTERIA COMPOSITION

Morio Kurasawa, Tokyo, Japan, assignor to Kurasawa Optical Industry Co., Ltd., Tokyo, Japan

Filed Apr. 21, 1989, Ser. No. 341,443
Int. Cl.[5] A61K *39/02*; A23K *00/00*
U.S. Cl. 424—442 9 Claims

1. A composition for deodorizing animal, fish and bird excrements comprising a deodorizing effective amount of a synergistic combination consisting essentially of at least one butyric acid producing bacteria and at least one bacteria from the genus *Bacillus subtilis* mixed with a carbon containing growth substrate wherein there is 0.1 to 10% by weight of said synergistic combination of bacteria wherein the ratio of the bacteria from the genus *Bacillus Subtilis* to the butyric acid-producing bacteria is between about 1:3 to 3:1.

4,996,056

DENTAL FLOSS AND TAPE

Jacob M. Blass, London, England, assignor to Westone Products Limited, London, England

Filed Aug. 14, 1989, Ser. No. 393,370
Claims priority, application United Kingdom, Aug. 22, 1988, 8819873
Int. Cl.[5] A61F *13/00*
U.S. Cl. 424—443 10 Claims

1. A dental floss or tape comprising a multi-filament yarn and a binder between the individual filaments holding the filaments together in the yarn, and fluorocarbon polymer powder particles in said binder, said powder particles being present in an amount of up to 80% by weight based on the weight of the binder and having an average particle size in the range of 1 to 50 μm.

4,996,057

COMPOSITION FOR LOCALLY TREATING THE EPIDERMIS, ESPECIALLY THE SCALP

Nadine Schoeff, 12, Boulevard d'Andilly "Les Atlantes", 95160 Montmorency, and Jean-Pierre Poujol, deceased, late of Saint-Owen, both of France (by Raymonde Poujol), assignors to Nadine Schoeff, Montmorency, France

PCT No. PCT/FR88/00147, § 371 Date Jan. 24, 1989, § 102(e) Date Jan. 24, 1989, PCT Pub. No. WO88/07363, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 21, 1988, Ser. No. 328,221

Claims priority, application France, Apr. 3, 1987, 87 04737

Int. Cl.[5] A61K 7/06

U.S. Cl. 424—451 6 Claims

1. A composition for the local treatment of the scalp of a subject comprising from 0.1 to 10 mg/ml of proteinic compounds from human placental tissue and from 10^{-3} to 1 mg/ml of a condensation product of N-methyl-p-methoxyphenethylamine with formaldehyde.

4,996,058

COVERED RETARD FORMS

Joel Sinnreich, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sep. 12, 1988, Ser. No. 242,833

Claims priority, application Switzerland, Sep. 18, 1987, 3621/87

Int. Cl.[5] A61K 9/58

U.S. Cl. 424—462 5 Claims

1. A film coated or capsule dosage form which effects delayed release of an active pharmaceutical ingredient in the stomach which comprises:

(a) at least one component that expands on contact with gastric juice and contains an agent capable of releasing carbon dioxide or nitrogen, a pharmaceutically active ingredient or a combination thereof and, optionally, a pharmaceutically acceptable hydrophilic swelling agent selected from the group consisting of lower alkyl ethers of cellulose, starches, water-soluble aliphatic or cyclic poly-N-vinylamides, polyvinyl alcohols, polyacrylates, polymethacrylates, polyethylene glycols and mixtures thereof and further pharmaceutical formulation adjuncts used for the manufacture of oral dosage forms,

(b) at least one hydrophilic membrane in the form of a sachet which contains component (a), is expansible by inflation and floating on the aqueous phase in the stomach and permeable to gastric juice and,

(c) a film coating or capsule form which contains components (a) and (b) and which disintegrates without delay in the stomach under the action of gastric juice.

4,996,059

COMPOSITION FOR THE TREATMENT OF KERATIN FIBERS, BASED ON AMPHOTERIC POLYMER AND CATIONIC POLYMER

Jean F. Grollier, and Claire Fiquet, both of Paris, France, assignors to L'Oreal, Paris, France

Continuation of Ser. No. 517,565, Jul. 28, 1983, abandoned, which is a continuation of Ser. No. 210,620, Nov. 26, 1980, abandoned. This application Mar. 26, 1990, Ser. No. 498,490

Claims priority, application France, Nov. 28, 1979, 79 29318

Int. Cl.[5] A61K 7/075, 7/08, 7/09; C11D 3/37

U.S. Cl. 424—71 2 Claims

1. Process for the treatment of keratin fibres, which comprises applying in a first stage, a composition containing a cationic polymer selected from the group consisting of:

(1) a quaternised or unquaternised vinylpyrrolidone polymer,

(2) a quaternised guar gum derivative,

(3) a cationic polymer having the formula:

$$—A—Z—A—Z— \quad (VI)$$

in which A denotes a radical containing two functional amino groups, and Z denotes the symbol B or B', B and B', which are identical or different, denoting a linear or branched alkylene radical which is unsubstituted or substituted by one or more hydroxyl groups and optionally one or more chain oxygen, nitrogen or sulphur atoms and 1 to 3 aromatic and/or heterocyclic rings, or having the formula:

$$—A—Z_1—A—Z_1— \quad (VII)$$

in which A is as defined above and Z_1 denotes the symbol B_1 or B'_1 and denotes B'_1 at least once, B_1 being a linear or branched alkylene or hydroxyalkylene radical and B'_1 being a linear or branched alkylene radical which is unsubstituted or substituted by one or more hydroxyl radicals and contains one or more chain nitrogen atoms, the nitrogen atom being substituted by an alkyl chain which optionally contains a chain oxygen atom and optionally contains one or more hydroxyl groups, or a product resulting from the alkylation with an alkyl or benzyl halide or lower alkyl tosylate or mesylate, of a polymer of formula (VI) or (VII), or a product resulting from the oxidation of a said polymer,

(4) a polyaminoamide,

(5) a crosslinked polyaminoamide selected from:

(a) a water-soluble crosslinked and optionally alkylated polyaminoamide obtained by crosslinking a polyaminoamide, prepared by the polycondensation of an acid compound with a polyamine, with a crosslinking agent which is an epihalogenohydrin, diepoxide, dianhydride, unsaturated anhydride or a bis-unsaturated derivative, in an amount from 0.025 to 0.35 mol per amine group of the polyaminoamide;

(b) a water-soluble crosslinked polyaminoamide obtained by crosslinking a polyaminoamide as defined under (a) with a crosslinking agent selected from:

(I) a bis-halogenohydrin, bis-azetidinium compound, bis-halogenoacyldiamine or alkylene dihalide,

(II) an oligomer obtained by reacting a compound of group I, or an epihalogenohydrin, diepoxide or bis-unsaturated derivative, with a difunctional compound which is reactive towards said compound, and

(III) a product resulting from the quaternisation of a compound of group I or an oligomer of group II and containing one or more tertiary amine groups which can be totally or partially alkylated, with an alkylating agent, the crosslinking being carried out using 0.025 to 0.35 mol of crosslinking agent per amine group of the polyaminoamide; and

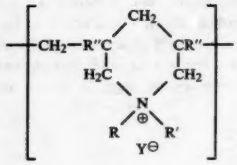
(c) a water-soluble polyaminoamide derivative resulting from the condensation of a polyalkylene-polyamine with a polycarboxylic acid, followed by alkylation with a difunctional agent, said derivatives being a adipic acid/dialkylaminohydroxyalkyl-dialkylenetriamine copolymer,

(6) cationic non-ether cellulose polymer,

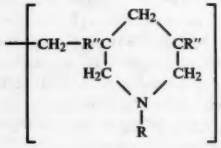
(7) polyamine containing two primary amine groups and at least one secondary amine group, with a diglycolic acid or a saturated aliphatic dicarboxylic acid having 3 to 8 carbon atoms, the molar ratio of the polyalkylene-polyamine to the dicarboxylic acid being from 0.8: to 1.4:1, and reacting the resulting polyamide with epichlorohydrin in a molar ratio of epichlorohydrin to the secondary amine groups of the polyamide of 0.5:1 to 1.8:1,

(8) a homo- or co-polymer containing, as the main constituent of the chain, units corresponding to the formula VIII or VIII':

(VIII)



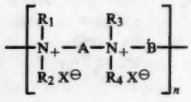
(VIII')



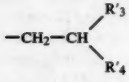
in which formulae R'' denotes hydrogen or methyl, R and R' independently denote an alkyl group having from 1 to 22 carbon atoms, a hydroxyalkyl group, or a lower amidoalkyl group, or R and R', together with the nitrogen atom to which they are attached, denote a heterocyclic group,

(9) a poly-(quaternary ammonium) compound of the formula:

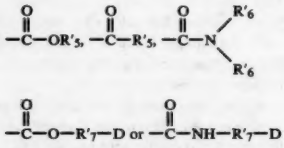
(IX)



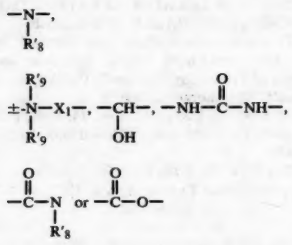
in which R_1, R_2, R_3 and R_4, which are identical or different, represent an aliphatic, alicyclic or arylaliphatic radical containing a maximum of 20 carbon atoms, or a lower hydroxyaliphatic radical or alternatively R_1 and R_2, and R_3 and R_4, together or separately denote with the nitrogen atoms to which they are attached, a heterocyclic ring which optionally contains a second hetero-atom other than nitrogen, or alternatively R_1, R_2, R_3 and R_4 represent a group of the formula



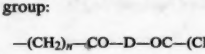
in which R'_3 denotes hydrogen or lower alkoxy and R'_4 denotes —CN, or a group



R'_5 denoting lower alkyl, R'_6 denoting hydrogen or lower alkyl, R'_7 denoting alkylene and D denoting a quaternary ammonium group, A and B independently represent polymethylene groups containing from 2 to 20 carbon atoms, which is linear or branched and saturated or unsaturated and optionally contain one or more chain aromatic rings or one or more groups —CH_2—Y—CH_2—, in which Y denotes O, S, SO, SO_2, —S—S—,

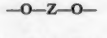


in which X_1^- denotes an anion derived from a mineral or organic acid, R'_8 denoting hydrogen or lower alkyl and R'_9 denotes lower alkyl, or alternatively A, R_1 and R_3 form together with the two nitrogen atoms to which they are attached a piperazine ring, and, additionally, if A denotes a linear or branched, saturated or unsaturated aliphatic or hydroxy-aliphatic radical, B can also denote a group:

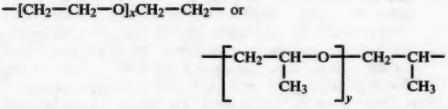


in which D denotes:

(a) a glycol residue of the formula

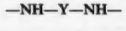


in which Z denotes a linear or branched hydrocarbon radical or a group corresponding to the formula:



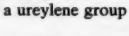
in which x and y independently denote an integer from 1 to 4,

(b) a bis-primary diamine residue of the formula:



in which Y denotes a linear or branched hydrocarbon radical or the divalent radical —CH_2—CH_2—S—S—CH_2—CH_2—; or

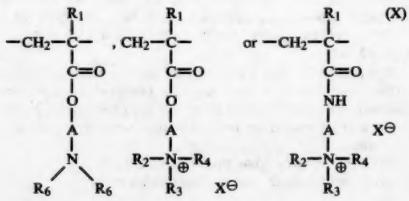
(c) a ureylene group of the formula



n is such that the molecular weight of the compound is from 1,000 to 100,000; and X—denotes an anion;

(10) a homopolymer or copolymer containing the recurring unit of formula:

(X)



in which R_1 is H or CH_3, A is a linear or branched alkyl group having up to 6 carbon atoms or a hydroxyalkyl

group having 1 to 4 carbon atoms, R_2, R_3 and R_4, which are identical or different, denote an alkyl group having 1 to 18 carbon atoms or a benzyl group, R_5 and R_6 denote H or alkyl having 1 to 6 carbon atoms, and X− denotes an anion

(11) a polyalkyleneimine

(12) a polymer containing chain vinylpyridine or vinylpyridinium units

(13) a product resulting from the condensation of a polyamine and epichlorohydrin

(14) a quaternary polyureylene compound

(15) a chitosan derivative and in a second stage, a composition containing at least one amphoteric polymer containing units A and B distributed in the polymer chain, where A denotes a unit derived from a monomer containing at least one basic nitrogen atom and B denotes a unit derived from an acid monomer containing one or more carboxyl or sulphonyl groups, or, alternatively, A and B denote a group derived from a zwitterionic carboxybetaine monomer; or A and B denote a cationic polymer chain containing secondary or tertiary amine groups or quaternary ammonium groups, in which chain at least one of the amine groups carries a carboxyl or sulphonyl group joined via a hydrocarbon radical, or A and B form part of a polymer with alpha, beta-dicarboxyethylene units, in which one of the carboxyl groups has been reacted with a polyamine containing one or more primary or secondary amine groups; said amphoteric and cationic polymers being present in an amount of 0.01 to 10% by weight and said amphoteric and cationic polymers having a molecular weight of 500 to 2,000,000, and said composition containing essentially no anionic polymer.

2. Process according to claim 1 in which the first composition further contains a reducing agent and the second composition further contains a neutralising agent.

4,996,060
DEVICE COMPRISING LINER FOR PROTECTING FLUID SENSITIVE MEDICAMENT

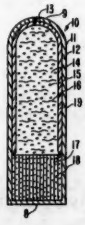
James B. Eckenhoff, Los Altos; Judy A. Magruder, Mt. View; Richard Cortese, Cupertino; John R. Peery, Palo Alto, and Jeremy C. Wright, Los Altos, all of Calif., assignors to ALZA Corporation, Palo Alto, Calif.

Continuation of Ser. No. 173,209, Mar. 25, 1988, Pat. No. 4,855,141. This application Apr. 6, 1989, Ser. No. 334,251

The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.

Int. Cl.[5] A61R *9/24*

U.S. Cl. 424—473 **10 Claims**



1. A device for delivering a beneficial agent to an environment of use, wherein the device comprises:

(a) a wall comprising in at least a part a composition permeable to the passage of aqueous fluid, which wall surrounds;

(b) an internal space;

(c) a beneficial agent in the internal space;

(d) a pharmaceutically acceptable carrier for the beneficial agent in the internal space;

(e) a liner comprising a composition substantially impermeable to the passage of aqueous fluid, said liner in the internal space that surrounds the area initially occupied by the beneficial agent for substantially preventing the passage of fluid into the internal space whereby the beneficial agent is substantially shielded from fluid contact;

(f) means in the internal space for displacing the beneficial agent from the device; and,

(g) means in the wall connecting the exterior of the device with the internal space for delivering the beneficial agent to the environment of use.

4,996,061
PHARMACEUTICAL COMPOSITION FOR PIPERIDINOALKANOL-DECONGESTANT COMBINATION

Norval E. Webb, Middletown, and Gregory V. Hammer, West Chester, both of Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Continuation-in-part of Ser. No. 379,728, Jul. 14, 1989, abandoned, which is a continuation of Ser. No. 211,308, Jun. 24, 1988, abandoned, Continuation-in-part of Ser. No. 105,939, Oct. 7, 1987. This application Dec. 28, 1989, Ser. No. 438,966

Int. Cl.[5] A61K *9/36*

U.S. Cl. 424—475 **12 Claims**

1. A pharmaceutical composition in the form of a multiple-compression tablet comprising

(a) a discrete zone made with Formulation (A) which comprises a carrier base material combined with a therapeutically effective decongestant amount of a sympathomimetic drug, or a pharmaceutically acceptable salt thereof, the carrier base material begin a mixture of (I) one or more pharmaceutically acceptable water-soluble nonionic cellulose ethers in an amount from about 18% to about 50% by weight of Formulation (A), (ii) one or more pharmaceutically acceptable anionic surfactants in an amount from about 2% to about 20% by weight of Formaulation (A), and (iii) one or more other pharmaceutically acceptable excipients, wherein said carrier base material provides a sustained release of the sympathomimetic drug, and

(b) a discrete zone made with Formulation (B) which comprises a second carrier base material combined with a therapeutically effective antihistaminic amount of a piperidinoalkanol, or a pharmaceutically acceptable salt thereof, the second carrier base being a mixture of (i) calcium carbonate in an amount from about 0.5% to about 25% by weight of Formulation (B), (ii) one or more pharmaceutically acceptable nonionic surfactants in an amount from about 1% to about 10% by weight of Formulation (B), and (iii) one or more other pharmaceutically acceptable excipients, wherein Formulation (B) optionally also contains a therapeutically effective decongestant amount of a sympathomimetic drug, or a pharmaceutically acceptable salt thereof, and wherein said second carrier base material provides an immediate release of the piperidinoalkanol and of any sympathomimetic drug.

4,996,062
GLUCOSE OXIDASE FOOD TREATMENT AND STORAGE METHOD

Paavo Lehtonen, Niittypolku; Pirkko Aaltonen, Konalantie, and Ulla Karilainen, Porvoonkatu, all of Finland, assignors to Stabra AG, Zug, Switzerland

Filed Oct. 28, 1988, Ser. No. 263,811

Int. Cl.[5] A23B *4/22*

U.S. Cl. 426—8 **7 Claims**

1. A method for extending the shelf life of a food product comprising: treating the product with a first preparation of substantially pure glucose oxidase and a second preparation of catalase, wherein the ratio of glucose oxidase to catalase is selected so as to maximize the anti-microbial effect of the peroxide produced by reaction of the glucose oxidase prior to its destruction by said catalase; and packaging the treated product in a sealed package, wherein the amount of glucose

oxidase added is sufficient to reduce the level of oxygen in the package to under about 1% within 5 days.

4,996,063

METHOD FOR MAKING A SOLUBLE DIETARY FIBER COMPOSITION FROM OATS

George F. Inglett, Peoria, Ill., assignor to The United States of America, as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jun. 30, 1989, Ser. No. 373,978

Int. Cl.[5] A23L *1/105*

U.S. Cl. 426—21 10 Claims

1. A method for producing a water-soluble dietary fiber composition comprising treating an aqueous dispersion of a gelatinized, milled, oat substrate with an α-amylase under conditions which will hydrolyze the substrate and yield a soluble fraction and an insoluble fraction, separating said soluble fraction from said insoluble fraction, and recovering from said soluble fraction said water-soluble dietary fiber substantially free of water-insoluble fiber.

4,996,064

FOODSTUFF FROM SOYMILK AND METHOD FOR PRODUCTION THEREOF

Hirofumi Akano; Takeshi Sato; Hajime Okumura; Yoshiya Kawamura, all of Aichi, and Kyo Shimada, Mie, all of Japan, assignors to Nakano Vinegar Co., Ltd., Aichi, Japan

Filed Aug. 22, 1989, Ser. No. 396,662

Claims priority, application Japan, Aug. 24, 1988, 63-208287; May 18, 1989, 1-125268

Int. Cl.[5] A23L *1/20*

U.S. Cl. 426—46 14 Claims

1. A method for the production of a foodstuff, which comprises treating soymilk with a milk-coagulating enzyme produced by a milk-coagulating system enzyme-producing microorganism selected from the group consisting of *Aspergillus sojae* (IFO- 4241), *Aspergillus sojae* (IFO-4386), *Aspergillus sojae* (IFO-4403), *Aspergillus sojae* 5119 FERM BP-2520 (FERMP-10220), *Mucor* sp. strain 5121 FERM BP-2521 (FERMP-10221) and *Rhizopus* sp. strain 5120 FERM BP-2522 (FERMP-10222), said enzyme possessing a protease activity (B) and a milk-coagulating activity (A) such that the ratio of (A)/(B) is larger than 0.1, and collecting a resultant coagulated material.

4,996,065

MOLASSES-FREE CHEMICALLY REACTIVE BINDER FOR ANIMAL FEED

Richard H. Van de Walle, Columbia, Md., assignor to Martin Marietta Magnesia Specialties Inc., Hunt Valley, Md.

Continuation of Ser. No. 300,106, Jan. 19, 1989, abandoned, which is a continuation-in-part of Ser. No. 819,323, Jan. 16, 1986, abandoned. This application Jul. 16, 1990, Ser. No. 554,950

Int. Cl.[5] A23K *1/00*

U.S. Cl. 426—72 10 Claims

1. A molasses-free pelletized and compressed animal feed composition consisting essentially of a dry mixture of feed ingredients and a binder therefor, said binder consisting essentially of from about 0.1 percent to about 5.0 percent by weight of the total feed formulation of a reactive phosphate source selected from the group consisting of phosphate acid, ammonium polyphosphate, monoammonium phosphate, diammonium phosphate, monopotassium phosphate, dipotassium phosphate, monosodium phosphate, monocalcium phosphate, disodium phosphate, and combinations thereof, and from about 0.25 percent to about 5.0 percent by weight of the total feed formulation of a reactive metal source selected from the group consisting of magnesium oxide, aluminum oxide, potassium oxide, calcium oxide, magnesium calcium oxide, magnesium hydroxide, aluminum hydroxide, potassium hydroxide, calcium hydroxide, calcium sulfate, magnesium potassium sulfate, magnesium sulfate, potassium sulfate, calcium chloride, magnesium chloride, magnesium carbonate, and combinations thereof whereby pellet durability index is increased and percent of recycled fines is reduced.

4,996,066

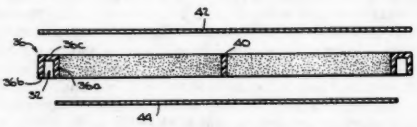
BEVERAGE FLAVORING CASSETTE

Graham Love; Karl Schellhaass; Bärbel Rathjen, all of Bremen, and Jürgen Schwarz, Bremerhaven, all of Fed. Rep. of Germany, assignors to Hag GF Aktiengesellschaft, Bremen, Fed. Rep. of Germany

Filed May 15, 1989, Ser. No. 351,736

Int. Cl.[5] B65D *85/00;* B65B *29/02;* A47J *31/00*

U.S. Cl. 426—77 9 Claims



1. A cassette for flavoring a liquid and for use with a liquid receptacle, said liquid receptacle having an interior for receiving liquid and having a bottom portion defining a bottom opening for passing the liquid outward from said interior, said liquid receptacle further including an internal locking flange adjacent to and around said bottom opening and said flange extending upward from said bottom portion, the cassette comprising:

(a) a ring defining an interior and having a bottom surface and a top surface, the ring including

(i) an inside annular leg,

(ii) an outside annular leg radially spaced from and concentric with the inside annular leg, and

(iii) a shoulder portion connected to and extending between the inside and outside annular legs; the inside and outside annular legs and the shoulder portion define a bottom annular groove to receive said locking flange on said liquid receptacle, said cassette including said annular groove being dimensioned and shaped such that when said cassette is placed in said liquid receptacle with said annular groove positioned down onto said locking flange, the cassette is held securely in place while a liquid flows through it and a liquid seal is formed between said cassette and the bottom of the receptacle extending around said opening to prevent liquids from leaking out from the interface between said cassette and said liquid receptacle;

(b) a plurality of ribs connected to and extending across said ring and separating the interior thereof into a multitude of at least 3 sections;

(c) particles disposed in said sections for flavoring a liquid; and

(d) a bottom filter and a top filter secured to the ring and extending across the bottom and the top, respectively, of the interior of said ring to hold the flavoring particles therein.

4,996,067

FEED ADDITIVE FOR RUMINANTS

Takaaki Kobayashi, Yokohama; Takahumi Tosa, Kawasaki; Hiroyuki Sato, Yokohama; Hiroyoshi Okada, Machida; Masao Miyake, and Kenji Mori, both of Yokohama, all of Japan, assignors to Mitsubishi Kasei Corporation and Ajinomoto Co., Inc., both of Tokyo, Japan

Filed Jul. 19, 1989, Ser. No. 381,837

Claims priority, application Japan, Jul. 19, 1988, 63-178256; Jul. 19, 1988, 63-178257; Jul. 19, 1988, 63-178258

Int. Cl.[5] A23D *1/00*

U.S. Cl. 426—96 21 Claims

1. A feed additive for ruminants, which consists essentially of cores containing an acid salt of a basic amino acid, and

effective amounts to attain the protection of the core material in a pH region corresponding to the rumen and to attain the release of the core material in a pH region corresponding to the abomasum of a first coating layer and a second coating layer coated sequentially on the surface of each core, wherein said first coating layer contains at least one first coating agent selected from the group consisting of a neutral or weakly acidic organic substance, a substantially neutral fine powder of inorganic substance, a non-ionic hydrophilic polymer substance and an anionic hydrophilic polymer substance and being physiologically acceptable to the ruminants, and the second coating layer contains as a second coating agent a polymer solube or swellable in water in an acidic region of a pH of at most 5.5.

4,996,068

METHODS FOR TREATING FOOD AND A DEOXODIZER PACKAGE IN A MICROWAVE OVEN

Hidetoshi Hatakeyama, and Takashi Kashiba, both of Tokyo, Japan, assignors to Mitsubishi Gas Chemical Company, Japan

Filed Nov. 30, 1988, Ser. No. 278,363

Claims priority, application Japan, Dec. 2, 1987, 62-303281; Dec. 2, 1987, 62-303282; Dec. 2, 1987, 62-303283

Int. Cl.[5] A23L *1/025, 3/34, 3/36;* **C09K** *15/02*

U.S. Cl. 426—234 **6 Claims**

1. A method of freeze-storing and thawing a food, comprising the steps of:

placing a food having a water content of 8% or more and a deoxidizer package in a pack container made of a material having an oxygen permeability of 200 ml/m^2 24 hr atm or less, said deoxidizer package including a deoxidation composition containing iron powder, a metal halide, and a material to dissipate heat generated in said iron powder upon irradiation with microwaves comprising a powder filler having a water solubility of about zero, a particle size of 60 mesh or finer and a specific surface area of 50 m^2/g or less, said powder filler being contained in amount of 100 volume parts or more for 100 volume parts of said iron powder, said deoxidizer package further including a gas permeable packaging material containing said deoxidation composition and having a gas permeability of 1,000 seconds/100 cc or less in terms of Gurley gas permeability;

sealing and freeze-storing said pack container containing said food and said deoxidizer package; and

subjecting said container to a microwave irradiation so as to thaw said food.

4,996,069

PROCESS FOR THE PREPARATION OF FLAVOR AND FRAGRANCE MATERIALS

Johannes T. de Hey, Hilversum; Harrie Renes, Blaricum, and Jan Visser, Huizen, all of Netherlands, assignors to Unilever Patent Holdings B.V., Rotterdam, Netherlands

Filed Nov. 15, 1989, Ser. No. 436,801

Claims priority, application Netherlands, Nov. 18, 1988, 8802848

Int. Cl.[5] A23L *1/00*

U.S. Cl. 426—248 **11 Claims**

1. A process for the preparation of a product which is useful as a flavor or fragrance material which comprises oxidizing a solution of carotene in an aprotic solvent with oxygen under the influence of ultraviolet light and subsequently substantially removing the aprotic solvent from the product.

4,996,070

NATURAL FRUIT FLAVOR EXTRACTS

Karim Nafisi-Movaghar, Walnut Creek, Calif., assignor to Del Monte Corporation, San Francisco, Calif.

Continuation-in-part of Ser. No. 369,149, Jun. 21, 1989, and a continuation-in-part of Ser. No. 155,611, Feb. 12, 1988, Pat. No. 4,948,609. This application Jan. 11, 1990, Ser. No. 463,502

Int. Cl.[5] A23L *2/02*

U.S. Cl. 426—330.5 **34 Claims**

1. A process for preparing a fruit flavored, aqueous extract solution comprising the steps of:

(a) immersing a fruit in an aqueous infusion solution containing a reducing agent, an acid and at least one disaccharide and infusing the fruit at a temperature of about 120° F. to about 212° F. for a time sufficient to infuse the fruit and extract an effective amount of flavor components from the fruit and to produce a fruit-flavored solution;

(b) separating the fruit from the solution; and

(c) recovering the solution, wherein the solution contains fruit flavors, sugars, and extracted components from the fruit.

4,996,071

METHOD FOR PACKAGING PERISHABLES

Laurence D. Bell, 12440 Saddle Way, Carmel Valley, Calif. 93924

Continuation of Ser. No. 43,427, Apr. 28, 1987, abandoned. This application Aug. 26, 1988, Ser. No. 238,962

Int. Cl.[5] A23B *7/00;* **B65B** *25/02*

U.S. Cl. 426—415 **20 Claims**

1. A method for optimizing the shelf life of at least one respiring perishable in a package made of packaging material that transmits oxygen and carbon dioxide comprising the following steps:

(1) determining the respiration rate (R) of said perishable;

(2) selecting a packaging material for said respiring perishable that has known or ascertainable transmissibility to oxygen and carbon dioxide;

(3) preparing a first plurality of packages, each package containing said perishable in said packaging material, and each of said first plurality of packages having a different permeant factor (G) and different atmosphere quotient value (AQ) from the other packages in said first plurality, where G is equal to: the are (A) of said packaging material required to enclose a given weight of said perishable in a gaseous atmosphere that includes oxygen, multiplied by the permeability (P) of said packaging material to carbon dioxide or oxygen, and divided by the weight (W) of said perishable to be enclosed in said package; and wherein AQ is equal to G divided by R and said different permeant factors result from varying at least one of A, P or W in each package of said first plurality;

(4) subjecting each of said packages in said first plurality containing said perishable to the same given, known temperature and pressure over a known period of time; observing the quality, appearance and marketability of said respiring perishable in each of said packages after the gaseous atmosphere in each of said packages reaches equilibrium; and, based on these observations, determining which of said packages has optimum shelf life;

(5) repeating, as necessary, steps (3) and (4) with at least one additional plurality of packages, each of said additional packages having permeant factors different from the packages in said first plurality and different from the other packages in said additional plurality until an AQ value representing optimum shelf life for said perishable has been determined;

(6) from the atmosphere quotient values determined in steps (3), (4) and (5), deriving the equivalent permeant factors G for those packages which have optimum shelf life as determined in step (4), in accordance with the formula AQ equals G divided by R; and

(7) using said equivalent permeant factors G, preparing an

optimum package containing said perishable from said packaging material by varying one or more of the variables A, P and/or W while maintaining said equivalent permeant factor G to achieve and maintain the optimum atmosphere shelf life for said perishable in said optimum package.

4,996,072

PHYSICAL PROCESS FOR THE DEODORIZATION AND/OR CHOLESTEROL REDUCTION OF FATS AND OILS

Steven S. Marschner, Minneapolis, Minn., and Jeffrey B. Fine, Harrisburg, Pa., assignors to General Mills, Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 20,613, Mar. 2, 1987, Pat. No. 4,804,555. This application Feb. 13, 1989, Ser. No. 310,536

The portion of the term of this patent subsequent to Feb. 14, 2006, has been disclaimed.

Int. Cl.[5] A23D *5/00;* **C11B** *3/14*

U.S. Cl. 426—417 **22 Claims**

1. A method for deodorizing and/or reducing cholesterol level of fats and oils comprising the steps of:

A. providing an oil having a native cholesterol and/or odoriferous material level;

B. heating said oil to a temperature of about 400° to 550° F.;

C. flash vaporizing said heated oil to vaporize said oil or a portion thereof and at least a portion of the cholesterol and/or odoriferous materials to realize a par-treated oil liquid phase and a loaded vaporous phase and wherein the temperature is maintained at about 400° to 550° F.;

D. thin-film steam stripping the par-treated oil in a stripper having an evaporative surface at a pressure of about 1 to 7 mmHg with a countercurrent steam feed to strip a portion of the cholesterol and/or odoriferous material from said par-treated oil to provide a clean oil having a cholesterol content less than its native level and a loaded steam feed containing said stripped cholesterol and/or odoriferous material;

E. removing the loaded vaporous phase and the loaded steam feed; and

F. cooling the clean oil to a temperature of less than about 100° F.

4,996,073

METHOD AND COMPOSITION FOR REMOVING OXYGEN FROM SOLUTIONS CONTAINING ALCOHOLS AND/OR ACIDS

James C. Copeland, Ashland, Ohio; Howard I. Adler, Oak Ridge, and Weldon D. Crow, Knoxville, both of Tenn., assignors to Oxyrase, Inc., Ashland, Ohio

Filed Aug. 29, 1989, Ser. No. 399,870

Int. Cl.[5] C12G *1/00;* **C12H** *1/00*

U.S. Cl. 426—487 **18 Claims**

1. A method for removing oxygen from a food stuff or beverage solution containing alcohol comprising the steps of:

(a) providing a food stuff or beverage solution containing alcohol; and,

(b) adding to the solution a sufficient amount of oxygen scavenging membrane fragments to reduce the oxygen present in the solution to water.

4,996,074

TAILORED BETA-PRIME STABLE TRIGLYCERIDE HARDSTOCK

Paul Seiden, and Robert L. White, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Nov. 14, 1988, Ser. No. 270,314

Int. Cl.[5] A23D *9/00*

U.S. Cl. 426—601 **29 Claims**

1. A beta-prime stable tailored triglyceride hardstock comprising:

(a) from about 45% to about 98% 2-Stearoyldipalmitin (PSP) triglycerides;

(b) from about 2% to about 55% 1-Palmitoyldistearin (PSS) triglycerides;

(c) less than about 7% tripalmitin (PPP) triglycerides;

(d) less than about 7% tristearin (SSS) triglycerides;

(e) less than about 3% diglycerides;

(f) less than about 10% total PPP and SSS triglycerides; and

(g) less than about 10% of the fatty acids of the total triglycerides and diglycerides being unsaturated;

wherein P=palmitic acid and S=stearic acid.

4,996,075

METHOD FOR PRODUCING ULTRATHIN METAL FILM AND ULTRATHIN-THIN METAL PATTERN

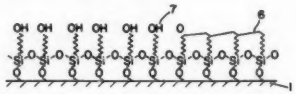
Kazufumi Ogawa, Hirakata; Hideharu Tamura, Katano, and Norihisa Mino, Settsu, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 21, 1988, Ser. No. 287,090

Claims priority, application Japan, Dec. 21, 1987, 62-323103; Sep. 28, 1988, 62-243008

Int. Cl.[5] B05D *3/06*

U.S. Cl. 427—12 **15 Claims**



1. A method for producing an ultrathin metal film which comprises:

a. depositing a monomolecular thin film having reactive groups capable of reacting with a metal salt to form a metal, on a substrate,

b. contacting the surface of said monomolecular thin film with a solution of said metal salt, whereby an ultrathin metal film is deposited on the surface of said thin film.

4,996,076

FILM FORMING METHOD

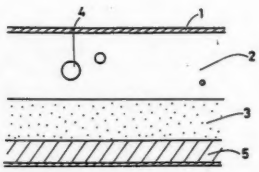
Toshiharu Nakaya; Satoru Nagahata, both of Osaka; Sakuichi Konishi, Nara, and Koichi Kuwano, Osaka, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Filed Mar. 24, 1989, Ser. No. 334,207

Claims priority, application Japan, Mar. 24, 1988, 63-71148

Int. Cl.[5] B05D *3/06*

U.S. Cl. 427—38 **3 Claims**



1. A method for forming a coating having a surface layer portion mainly composed of a water insoluble resin and a center portion mainly composed of a water soluble or dispersible resin on a hydrophobic surface of a substrate by using an aqueous coating composition characterized by subjecting a hydrophobic surface having a surface tension of 35 dyne or less to a dry surface treatment selected from a vacuum plasma treatment, a corona discharge treatment or an ozonization treatment, coating the thus-treated surface with a dispersion type aqueous coating composition varnish of at least one aque-

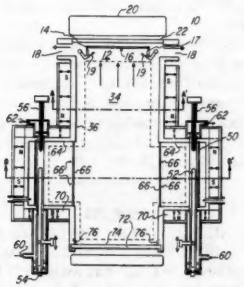
ous resin whose 1 wt. % deionized water solution has a surface tension of 51 dyne/cm or less and which has a water tolerance of 4 or more, and a water insoluble resin uniformly dispersed in fine particles in said varnish, said water insoluble resin having an SP value which is 1.0 to 2.2 lower than that of said aqueous resin, and baking the coating.

4,996,077

DISTRIBUTED ECR REMOTE PLASMA PROCESSING AND APPARATUS

Mehrdad M. Moslehi, and Steve S. Huang, both of Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 7, 1988, Ser. No. 255,208
Int. Cl.[5] B05D *3/06*
U.S. Cl. 427—38 **65 Claims**



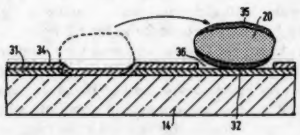
1. A distributed electron cyclotron resonance remote plasma processing apparatus, comprising:
(a) a processing chamber;
(b) a main transfer chamber in fluid communication with the processing chamber;
(c) a plurality of peripheral magnet bars substantially surrounding the main transfer chamber;
(d) a plurality of electron cyclotron resonance plasma formation regions peripherally distributed around the periphery of, remote from, and in fluid communication with the main transfer chamber; and
(e) a plurality of magnet bars substantially surrounding external surfaces of said plasma formation regions.

4,996,078

METHOD OF REMOVING PARTICLES FROM SUBSTRATE SURFACES

Horst-Christian Langowski, Hanover, Fed. Rep. of Germany, assignor to 501 Philips & Du Pont Optical Company, New York, N.Y.

Filed Jan. 26, 1990, Ser. No. 471,184
Claims priority, application Fed. Rep. of Germany, Feb. 1, 1989, 3902862
Int. Cl.[5] B05D *3/06*
U.S. Cl. 427—38 **12 Claims**



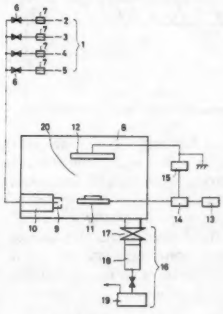
1. A method for the vacuum-coating of a substrate bearing adhering particles, said particles being of a size sufficient to cause holes, visible in transmission, to occur upon PVD coating of the particle-bearing substrate and displacement of said particles, said method comprising;
(a) introducing said particle-bearing substrate into a vacuum coating arrangement and providing, by a first PVD process in a vacuum a coating on said substrate and said adhering particles,
(b) displacing resultant coated particles form their initial positions while said substrate is in said vacuum coating arrangement and
(c) providing an additional coating, on said substrate, of a thickness sufficient to cover any hole caused by particle displacement, by a second PVD process while said substrate is in said vacuum-coating arrangement.

4,996,079

METHOD OF DEPOSITING THIN FILMS CONSISTING MAINLY OF CARBON

Kenji Itoh, Zama, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

Filed Feb. 17, 1989, Ser. No. 311,845
Claims priority, application Japan, Feb. 26, 1988, 63-43414; Mar. 2, 1988, 63-50397
Int. Cl.[5] B05D *5/12*; C23C *16/26, 16/50*
U.S. Cl. 427—39 **10 Claims**



1. A method for forming an amorphous carbon coating comprising the steps of:
placing an object in a reaction chamber;
introducing a reaction gas comprising carbon into said reaction chamber;
inputting an rf power to a pair of electrodes in order to decompose said reaction gas wherein said object is placed on one of said electrodes;
inputting a DC bias voltage to at least one of said pair of electrodes; and
depositing said amorphous coating on said object,
wherein said DC bias voltage is continuously changed in order that the hardness of said amorphous coating continuously changes with respect to the thickness of the coating.

4,996,080

PROCESS FOR COATING A PHOTORESIST COMPOSITION ONTO A SUBSTRATE

Ivan S. Daraktchiev, Louvain, Belgium, assignor to Olin Hunt Specialty Products Inc., Cheshire, Conn.

Filed Apr. 5, 1989, Ser. No. 333,519
Int. Cl.[5] B05D *3/12*
U.S. Cl. 427—57 **18 Claims**

1. A process for applying a film of uniform thickness of photoresist solids onto a substrate comprising the steps of:
(a) forming a liquid photoresist composition comprising photoresist solids in a solvent; the solids content of said

photoresist composition being in the range from about 10% by weight to about 22% by weight;

(b) forming atomized spray droplets of said liquid photoresist composition;

(c) allowing said atomized spray droplets to settle by gravity onto a substrate surface, thereby forming a photoresist coating on that surface; and

(d) spinning said coated substrate at a pre-determined spin speed and for a pre-determined time to remove substantially all of said solvent from said photoresist coating and to form a film of uniform thickness of photoresist solids on the substrate.

4,996,081

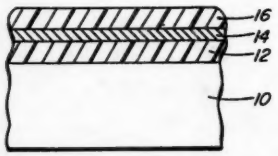
METHOD OF FORMING MULTIPLE NITRIDE COATING ON SILICON

Joseph P. Elul, 27 Burnbrook Crescent, Nepean, Ontario, Canada (K2H 9A6), and Sing P. Tay, 12 Vanessa Terrace, Nepean, Ontario, Canada (K2J 2J8)

Continuation of Ser. No. 693,490, Jan. 22, 1985, abandoned. This application Apr. 7, 1986, Ser. No. 848,609

Int. Cl.[5] B05D *5/12*; **C23C** *16/30*

U.S. Cl. 427—96 **15 Claims**



1. A method of forming a composite nitsinitride dielectric layer comprising in a first nitridation step, thermally growing a first silicon nitride layer on a silicon substrate, depositing a non-single crystal silicon layer on the silicon nitride, and, in a second nitridation step, thermally growing a second silicon nitride layer on the deposited silicon such that said first silicon nitride layer, said non-single crystal silicon layer and said second silicon nitride layer form a nitsinitride dielectric layer.

4,996,082

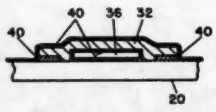
SEALED CAVITY SEMICONDUCTOR PRESSURE TRANSDUCERS AND METHOD OF PRODUCING THE SAME

Henry Guckel, and David W. Burns, both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Division of Ser. No. 174,821, Mar. 29, 1988, Pat. No. 4,853,669, which is a division of Ser. No. 855,806, Apr. 24, 1986, Pat. No. 4,744,863, which is a continuation-in-part of Ser. No. 727,909, Apr. 26, 1985, abandoned. This application May 11, 1989, Ser. No. 350,571

Int. Cl.[5] C23C *16/00*

U.S. Cl. 427—99 **12 Claims**



1. A method of sealing a structure on a substrate defined by a layer of material over a central cavity and at least one channel of a substantially lower height than the cavity which extend outwardly from the cavity to communication with the ambient atmosphere at peripheral positions, comprising: placing the structure in an ambient gas phase which can react to deposit solid material and reacting the gas phase to deposit solid material from the gas phase into the channels therein for a period of time sufficient to seal the channels with the deposited material so that atmospheric gases cannot enter or exit the cavity through the channels and such that the material from the gas phase trapped in the cavity is deposited on the walls of the cavity.

4,996,083

METHOD FOR DEPOSITION OF ELECTROCHROMIC LAYERS

Frank H. Moser, and Niall R. Lynam, both of Holland, Mich., assignors to Donnelly Corporation, Holland, Mich.

Division of Ser. No. 16,663, Feb. 19, 1987, Pat. No. 4,855,161. This application Jun. 12, 1989, Ser. No. 365,216

Int. Cl.[5] B05D *5/12*

U.S. Cl. 427—108 **47 Claims**

1. A method for preparing transition metal coating solutions which are suitable for preparing electrochromic layers and the like, comprising:

forming a first solution by reacting an anhydrous halide for an electrochromically active transition metal with a C_1 to C_5 carbon anhydrous at 0 to 80 degrees C., and

blending in a coating solution, in alcohol, comprising about 5% to about 10% tetraethyl orthosilicate, the ratio of said tetraethyl orthosilicate coating solution to said solution being about 10:90 to about 75:25.

4,996,084

COLLOIDAL SILICA WATER BASED SLURRY SYSTEM FOR INVESTMENT CASTING SHELL BACKUP COATS

Ahmed A. Elkachouty, Wayne, N.J., assignor to Pfizer Hospital Products Group, Inc., New York, N.Y.

Filed Jun. 30, 1989, Ser. No. 373,418

Int. Cl.[5] B05D *3/00*

U.S. Cl. 427—133 **4 Claims**

1. A water based slurry for use as a backup coat on a wax model utilized in the lost wax investment casting technique, the wax model having at least one prime coat, the water based slurry backup coat comprising a mixture of:

colloidal silica binder;

a latex glue;

ammonium alginate;

a wetting agent;

milled zircon;

tabular alumina; and

glass rock, said slurry having a viscosity of 10–14 sec. as measured by a #5 Zahn cup.

4. A method for coating a wax model to form a shell utilizable in a lost wax investment casting technique, comprising the steps of:

coating the wax model with at least one prime coat of a water based slurry containing a colloidal silica binder, milled zircon and tabular alumina;

covering said at least one prime coat with a stucco of alundum sand;

drying the at least one prime coat for at least four hours;

coating the dried prime coat with a first backup coat of a water based slurry having a viscosity of 10–14 sec. as measured by a #5 Zahn cup, and containing a colloidal silica binder, milled zircon, tabular alumina and glass rock;

drying the first backup coat for at least 5 hours;

covering at least the first backup coat with tabular alumina;

applying at least two additional backup coats of a water based slurry having a viscosity of 10–14 sec. as measured by a #5 Zahn cup, and containing a colloidal silica binder, milled zircon, tabular alumina and glass rock; and

covering a first of the at least two additional backup coats with tabular alumina, and allowing at least 5 hours drying time between the application of a second of the said at least two backup coats.

4,996,085

REPAIR COMPOSITION AND METHOD

G. Kelly Sievers, 1605 W. Magnolia Blvd., Burbank, Calif. 91506

Continuation of Ser. No. 74,955, Jul. 17, 1987, abandoned. This application Nov. 30, 1989, Ser. No. 443,448

Int. Cl.[5] B32B *35/00*

U.S. Cl. 427—140 8 Claims

8. Method of coating pumps, including applying to a pump surface to be coated a composition comprising a hardenable epoxy resin, a resin-reinforcing effective amount of reinforcing filler and a composition surface coefficient of friction reducing amount of a friction reducing agent comprising, fluorinated carbon, curing said composition in adhering relation to said surface, and finishing to a desired dimension.

4,996,086

METHOD FOR THE FABRICATION OF A MULTI-OVENABLE, RETORTABLE CONTAINER APPARATUS

Leonard E. Gerlowski; John R. Kastelic, both of Katy, and William H. Korcz, Houston, all of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Mar. 5, 1990, Ser. No. 488,930

Int. Cl.[5] B05D *1/18, 1/02*

U.S. Cl. 427—421 5 Claims

1. A process for the formation of a shelf stable, dimensionally heat stable, impact resistant, retortable, hot fillable container which is suitable for oven use, said process comprising the steps of:

providing a shaped first material layer having a first thickness formed from a linear alternating polymer of carbon monoxide, ethylene and propylene, which has the empirical formula,

$$[C{-}CH_2{-}CH_2]_x{-}[C{-}C_3H_6]_y;$$

and

coating a copolymer of vinylidene chloride material on at least one side of said first material layer to form a cooperatively-shaped second material layer having a second thickness; wherein the first thickness of said first material layer and the second thickness of said second material layer are selected such that the water percent weight loss per year of any contents stored in said container is less than 3% per year.

4. The process of claim 1 wherein the step of coating said copolymer on at least one untreated side of said first material is done by impact spraying said copolymer on said first material layer.

4,996,087

PERSONALIZED ORNAMENT HAVING A DESIGN OUTLINE

Roland B. Rebstock, 1642 Nie Parkway, New Orleans, La. 70114

Filed Jul. 11, 1989, Ser. No. 378,316

Int. Cl.[5] A47G *33/08*

U.S. Cl. 428—11 3 Claims

1. A decorative ornament, comprising:

a core having a smooth exterior surface and a coating suitable for receiving a multi-color drawing;

an indicia disposed upon said coating, said indicia including a one-color outline of a design imprinted on said coating, a non-colored space within the outline forming coloring space for subsequent coloring by an individual.

4,996,088

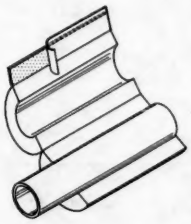
STORAGE STABLE ADHESIVE AND ITS LAMINATES

Gerald H. Knittel, Brecksville; Stanley D. Smith, Northfield; Richard C. Spector, Akron, and Jack M. McClintock, Stow, all of Ohio, assignors to Morgan Adhesives Co., Stow, Ohio

Filed Sep. 26, 1988, Ser. No. 249,119

Int. Cl.[5] A61F *13/02*

U.S. Cl. 428—40 6 Claims



1. A laminate comprising two surfaces spaced apart by an adhesive composition and held in that relationship by a bond between said surfaces and said adhesive, which comprises a mixture on a weight basis of an acrylic adhesive composition, 1 to 10 percent of an organic tin compound and 1 to 10 percent of an organic silicone of the formula

where R^1 and R are alkyl, cycloalkyl and aryl groups with the proviso that R^1 and R groups can be the same or different and N has a value of about 10 to 10,000.

4,996,089

OPTICAL DATA RECORDING MEDIUM

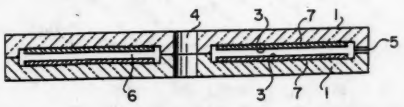
Osamu Saito, Takatsuki; Hisamitsu Kamezaki; Masashi Suenaga, both of Ibaraki; Ryo Nagai, Hirakata; Shinichiro Iuchi, Ibaraki; Hitoshi Watanabe, Ibaraki, and Hideo Fujiwara, Ibaraki, all of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

Filed Jul. 17, 1989, Ser. No. 380,295

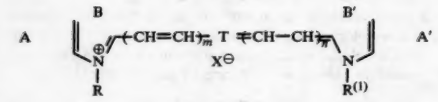
Claims priority, application Japan, Jul. 18, 1988, 63-177138; Jul. 23, 1988, 63-182793; Mar. 23, 1989, 1-69265

Int. Cl.[5] B32B *3/00*

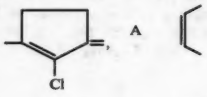
U.S. Cl. 428—64 16 Claims



1. An optical data recording medium, comprising a recording layer containing an organic dye, wherein said organic dye has the following formula:



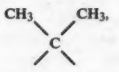
wherein is a carbon chain or ring to form a methyne chain, composed of —CH=CH—CH= or



may be equal to or different from

and at least one represents a benzene ring or monochlorobenzene ring,

B may be equal to or different from B' and at least one represents



R may be equal to or different from R(1), in which each represents CH_3, C_2H_5, C_3H_7, C_5H_7 or C_5H_{11},

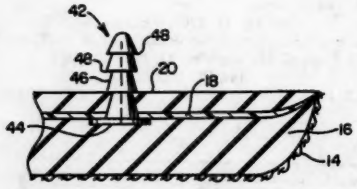
m and n each represents 0 or an integer of from 1 to 3, respectively, and have a relationship of $m+n \leqq 3$, associated with an anion selected from hexafluoro-phosphate ion (PF_6-), trifluoromethane sulfonate ion (CF_3SO_3-) or thiocyanate ion ($SCN-$), as the anion in an indol cyanine dye having a methyne chain.

4,996,090

DOOR PANEL

David M. Steinke, Baltimore; Michael Blankenship, Pataskala; Marshall G. Satterfield, Johnstown, and Philip D. Gardner, Sr., Findlay, all of Ohio, assignors to Process Bonding, Inc., Johnstown, Ohio

Filed Nov. 20, 1989, Ser. No. 439,172
Int. Cl.[5] B32B *3/26*
U.S. Cl. 428—71 **20 Claims**



1. A composite panel comprising, a series of layers bonded together having two faces and an edge periphery,

one face comprising a layer of decorative material, said one face being substantially planar except adjacent said periphery, adjacent said periphery said decorative material curving toward a second face to define a convex surface terminating at said periphery,

said decorative material being bonded to one side of a first foamed resin layer by an adhesive impregnating said foam, said foam being open celled and the adhesive being cured to fill the open cells,

the other side of said first foamed resin layer being bonded to a fiber glass layer,

said fiber glass layer being bonded to a second open celled foamed layer,

means adhered to said composite panel for connecting the panel to a substrate and

the periphery of said panel being compressed to a minimal thickness with the decorative material terminating substantially at said second face.

4,996,091

PRODUCT COMPRISING SUBSTRATE BEARING CONTINUOUS EXTRUDED FIBER FORMING RANDOM CRISSCROSS PATTERN LAYER

Frederic S. McIntyre, Wellesley, Mass., assignor to Acumeter Laboratories, Inc., Marlboro, Mass.

Division of Ser. No. 198,689, May 24, 1988, Pat. No. 4,891,249, which is a continuation of Ser. No. 36,254, May 26, 1987, abandoned. This application Dec. 2, 1988, Ser. No. 278,712
Int. Cl.[5] B32B *5/08*
U.S. Cl. 428—113 **10 Claims**

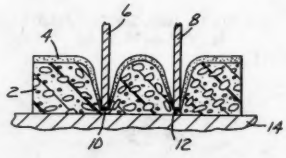
1. A product having a substrate upon which a single continuous fiber has been extruded in a random nondescript laterally criss-cross pattern layer at each of selected regions thereof.

4,996,092

SHAPED FOAM

David J. Francis, and David R. Bastow, both of Atherstone, England, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 5, 1990, Ser. No. 475,116
Claims priority, application United Kingdom, Feb. 20, 1989, 8903779; Oct. 20, 1989, 8924121
Int. Cl.[5] B32B *3/26*
U.S. Cl. 428—157 **24 Claims**



1. A foam article formed of a cold-weldable foam, the article being in the form of an elongate strip comprising a curved surface, the strip having at least one welded seam along its longitudinal length which maintains the configuration of the curved surface.

4,996,093

THERMAL TRANSFER RECORDING MEDIUM

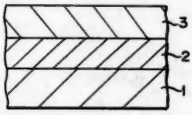
Kunihiro Koshizuka; Takao Abe; Tatsuichi Machashi, and Yoshihiro Inaba, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 49,042, May 8, 1987, abandoned, which is a continuation of Ser. No. 792,260, Oct. 28, 1985, abandoned. This application Dec. 7, 1989, Ser. No. 449,246

Claims priority, application Japan, Nov. 6, 1984, 59-232424; Nov. 6, 1984, 59-232425

Int. Cl.[5] B41M *5/26*

U.S. Cl. 428—212 16 Claims



1. A thermal transfer recording medium comprising a support and on said support:

(a) two coloring agent layers disposed successively on said support; or

(b) said two coloring agent layers with an intermediate layer positioned between said support and the coloring agent layer closest to said support; or

(c) said two coloring agent layers with an intermediate layer positioned between said coloring agent layers;

a first of said coloring agent layers containing a first heat-fusible wax selected from the group consisting of animal wax, plant wax, mineral wax, petroleum wax, and synthetic hydrocarbon wax and an adjacent layer to said first of said coloring agent layers containing a second heat-fusible substance which is immiscible with said first heat-fusible wax, said adjacent layer being (i) a second said coloring agent layer or (ii) said intermediate layer.

4,996,094

ONE-SIDED CLING/ONE-SIDED SLIP STRETCH WRAP FILMS

William M. Dutt, Pittsford, N.Y., assignor to Mobil Oil Corporation, Fairfax, Va.

Filed Sep. 26, 1988, Ser. No. 249,525

Int. Cl.[5] B32B *7/02*

U.S. Cl. 428—212 18 Claims

1. In a stretch wrap film having one cling surface and one noncling surface, the noncling surface capable of providing a slip property exhibited when the noncling surface is in contact with a like surface of itself with relative motion therebetween, the improvement comprising at least one region positioned between the cling and noncling surfaces of the film, said region being of a polyolefin material selected to provide barrier properties sufficient to maintain the cling and noncling properties of the cling and noncling surfaces.

4,996,095

COMPOSITE MATERIAL OF ALUMINUM AND GLASS FIBER MAT, METHOD FOR ITS PRODUCTION, AND METHOD FOR UTILIZATION AS INSULATOR FOR VEHICLES

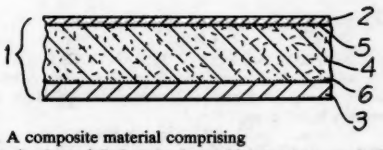
Hans Behdorf, Alfter; Thomas Singe, Swisttal, and Gerhardt Söllner, St. Augustin, all of Fed. Rep. of Germany, assignors to Vereinigte Aluminum Werke A.G., Fed. Rep. of Germany

Filed Jul. 1, 1988, Ser. No. 214,681

Claims priority, application Fed. Rep. of Germany, Jul. 1, 1987, 3721715; Jul. 1, 1987, 3721717

Int. Cl.[5] B32B *7/02, 15/08*

U.S. Cl. 428—215 13 Claims



1. A composite material comprising

an aluminum foil sheet having a thickness between 0.05 and 0.25 mm,

a fiberglass mat having a thickness of between 3 and 10 mm joined to one side of said foil by a bonding agent, and

an aluminum sheet having a thickness of between 0.4 and 0.8 mm joined to the other side of said glass mat by said bonding agent,

said bonding agent comprising a heat sealing lacquer comprising an ionomer resin layer having a weight of between 3 and 13 grams per square meter and

said composite material being flexible and deformable.

4,996,096

COEXTRUDED MATTE FILM

Jimmy S. Dew, Union City, Calif., assignor to James River II, Inc., Oakland, Calif.

Filed Oct. 17, 1988, Ser. No. 259,547

Int. Cl.[5] B32B *27/08*

U.S. Cl. 428—216 7 Claims

1. In a coextruded film having a nonembossed matte surface layer having a gloss of less than ten percent, the improvement wherein the matte surface layer consists essentially of a blend of from about ten to forty percent polyisobutylene, fifty to ninety percent high density polyethylene, and zero to forty percent propylene homopolymer, the polyisobutylene having a molecular weight of at least 50,000, and the matte surface layer has a coefficient of friction with itself of between about 0.2 and 0.7.

4,996,097

HIGH CAPACITANCE LAMINATES

Paul Fischer, Wilmington, Del., assignor to W. L. Gore & Associates, Inc., Newark, Del.

Filed Mar. 16, 1989, Ser. No. 324,832

Int. Cl.[5] B32B *27/00, 27/32*

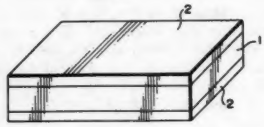
U.S. Cl. 428—220 7 Claims

1. A laminate comprising:

(a) a thin film of filled polytetrafluoroethylene that:

1. contains 25–85 volume percent particulate filler having a high dielectric constant,

2. has a film thickness of between 0.0001 and 0.005 inches,
3. is substantially free of visual pinholes, and
4. has a matrix tensile strength of at least 2600 psi, and



(b) a film of conductive metal attached to at least one side of the film defined in Part (a).

4,996,098

COATED CATION EXCHANGE FABRIC AND PROCESS

Stephen A. Perusich, Newark, and James T. Keating, Wilmington, both of Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 28, 1989, Ser. No. 316,635

Int. Cl.[5] B05D *3/06, 3/10;* **C25B** *1/16, 11/20;* **D06M** *14/10, 14/28, 15/256, 101/22*

U.S. Cl. 428—229 **22 Claims**

1. A cation exchange fabric comprising:

(a) a fabric base comprising interengaged yarns of a hydrolyzed fluorinated cation exchange copolymer having a mole ratio of non-functional to functional monomer of about 2.8–11.8:1 oriented at least 1× and

(b) coating on at least one surface of the fabric base or on the surface of the individual yarns comprising the fabric base, or peripheral surface areas of the yarns comprising the fabric base having been superficially converted to melt-processible form prior to their being made into the fabric base, said coating or peripheral areas comprising a melt-fabricable form of a fluorinated cation exchange copolymer having a mole ratio of non-functional:functional monomer differing from that of the fabric base copolymer by no more than 3 units.

4,996,099

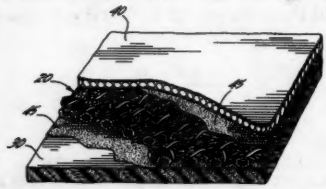
FIRE-RESISTANT FABRIC

William M. Cooke, Charlotte, N.C.; James E. Hendrix, Spartanburg, and Thomas W. Tolbert, Fort Mill, both of S.C., assignors to Springs Industries, Inc., Fort Mill, S.C.

Filed Oct. 27, 1989, Ser. No. 427,738

Int. Cl.[5] B32B *7/00*

U.S. Cl. 428—245 **6 Claims**



1. A fire-resistant laminate comprising an underlying flammable layer and a flame barrier fabric overlying said underlying flammable layer, said flame barrier fabric comprising a flame durable textile fabric substrate formed of corespun yarns, said yarns comprising a core of a flame resistant fiber and a sheath of modacrylic intumescent staple fibers which swell and form a char on exposure to flame.

4,996,100

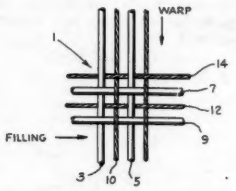
FABRIC OF MIXED YARNS

N. Ronald Druckman, 4 Woodbridge Cir., Evans, Ga. 30809

Filed Feb. 13, 1989, Ser. No. 310,302

Int. Cl.[5] B32B *7/00*

U.S. Cl. 428—259 **6 Claims**



1. A woven fabric comprising alternating warp yarns of a hard and a soft yarn; and

alternating filling yarns of a hard and a soft yarn;

said soft yarn being selected from the group consisting of acrylic fibers, polypropylene yarns, polyethylene and polyester.

4,996,101

PROCESSIBLE POLYIMIDE BLENDS

Abraham L. Landis, Northridge, and Kreisler S. Y. Lau, Alhambra, both of Calif., assignors to Lockheed Corporation, Calabasas, Calif.

Filed Aug. 8, 1988, Ser. No. 229,584

Int. Cl.[5] B32B *27/04;* **D03D** *3/00*

U.S. Cl. 428—272 **39 Claims**

1. In the process of making a semi-interpenetrating polyimide network wherein a linear polymer is combined and blended with ac ross-linkable oligomer and the resulting blend is cured, the improvement wherein the linear polymer comprises a thermoplastic polyisoimide and the cross-linkable oligomer comprises a thermosetting imide or isoimide oligomer having unsaturated terminal groups.

4,996,102

COMPOSITE NON-WOVEN FABRIC MATERIAL

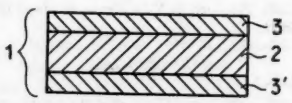
Hirofumi Kyutoku, Ikoma; Hiroyuki Matsuoka, Mie, and Yoshihisa Otani, Himeji, all of Japan, assignors to Osaka Gas Company, Limited, Osaku, Japan

Filed Jun. 27, 1989, Ser. No. 371,752

Claims priority, application Japan, Jun. 30, 1988, 63-164298

Int. Cl.[5] B32B *15/00*

U.S. Cl. 428—285 **21 Claims**

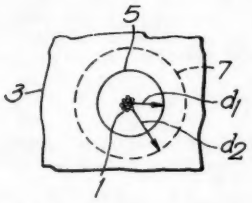


1. A composite non-woven fiber material comprising at least one stainless steel fiber layer and at least one carbon fiber layer, said at least one stainless steel fiber layer and said at least one carbon fiber layer being alternately intimately interlocked to form integrated composite material, at least one surface layer of said integrated composite material being a stainless steel fiber layer.

4,996,103
COMPOSITE ELEMENTS HAVING IMPROVED RESISTANCE AGAINST STRESS CRACKING CORROSION, MOST PREFERABLY FOR LOW TEMPERATURE HOUSING COMPARTMENTS

Rolf Henn, 7 Adolf-Engelhardt-Strasse, 6900 Heidelberg, and Reinhard Leppkes, 2 Eschkopfstrasse, 6712 Bobenheim-Roxheim, both of Fed. Rep. of Germany

Filed Mar. 30, 1990, Ser. No. 502,189
Int. Cl.[5] B32B *3/26*
U.S. Cl. 428—305.5 10 Claims



1. Composite elements having improved resistance against stress cracking corrosion, comprising:

(A) at least one top layer of polystyrene; and

(B) a layer of polyurethane foam, wherein the polyurethane foam is prepared while using difluorochloromethane as a blowing agent.

4,996,104
TEMPERATURE-SENSITIVE MATERIALS AND DEVICES

Beatrice M. Nicholas, Tring; Alan Mosley, Berkhamsted; Cyril Hilsum, Pinner, and Michael G. Clark, Gerrards Cross, all of England, assignors to The General Electric Company, p.l.c., England

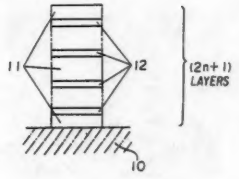
Continuation of Ser. No. 61,701, Jun. 12, 1987, abandoned. This application Mar. 23, 1989, Ser. No. 327,559
Claims priority, application United Kingdom, Jun. 18, 1986, 8614839
Int. Cl.[5] G01K *11/06*
U.S. Cl. 428—323 18 Claims

1. A temperature-sensitive device for monitoring a commodity to determine whether a total amount of time during which the commodity has been subjected to a temperature exceeding a predetermined temperature value is greater than an acceptable amount, the device comprising: a support member on which is deposited by printing at a first position a quantity of fracturable microcapsules containing a temperature-sensitive colored first medium which has a liquid state above said predetermined temperature value and which changes to a solid state at said predetermined temperature value; said microcapsules being fracturable while the medium is at a temperature above said predetermined temperature value to activate said device so that said colored first medium flows across the support member by a first distance forming a colored region having a size which is dependent upon a period of time elapsing between activation of the device and reduction of the temperature of the commodity below said predetermined value; said first medium responding to any subsequent rise in temperature above said predetermined temperature value by flowing further across said support member, thereby enlarging the colored region, which region provides a permanent irreversible indication as to whether said acceptable total amount of time has been exceeded.

4,996,105
TRANSPARENT LAMINATED PRODUCT

Takuji Oyama; Koichi Suzuki, and Mamoru Mizuhashi, all of Yokohama, Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 125,236, Nov. 25, 1987, Pat. No. 4,859,532. This application Jul. 11, 1989, Ser. No. 377,953
Claims priority, application Japan, Nov. 27, 1986, 61-280644; Nov. 27, 1986, 61-280645; Nov. 27, 1986, 61-280646
Int. Cl.[5] B32B *15/04*
U.S. Cl. 428—336 2 Claims

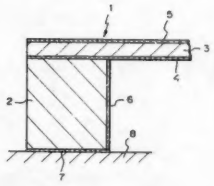


1. A transparent laminated product comprising a transparent substrate and a 5-layered transparent coating composed of a first transparent oxide layer formed on the substrate, a second Ag layer formed on the first transparent oxide layer, a third first transparent oxide layer formed on the second layer, a fourth Ag layer formed on the third transparent oxide layer and a fifth transparent oxide layer formed on the fourth layer, and having a visible ray transmission of at least 60%, wherein the thickness of each Ag layer is from 60 to 250 Å, and each transparent oxide layer comprises a material selected from the group consisting of SnO_2, $Sn_{1-x}Zn_xO_y$, and TiO_2.

4,996,106
PELLICLE

Hiroaki Nakagawa, Iwakuni, and Hitomi Matsuzaki, Yamaguchi, both of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Nov. 4, 1988, Ser. No. 267,380
Claims priority, application Japan, Nov. 5, 1987, 62-279627
Int. Cl.[5] B32B *7/12, 27/32*
U.S. Cl. 428—343 2 Claims



1. A pellicle comprising:

(a) a pellicle frame:

(b) a transparent pellicle film spread on one side face of said pellicle frame, said pellicle film having a refractive index, said pellicle film having an inner side face and an outer side face; and

(c) a tacky substance layer formed on said inner side face of said pellicle film, said tacky substance layer composed of tacky polyfluoro (meth)acrylate having a fluorine content of 50% by weight or more, having a high light transmittance and having a refractive index not higher than that of said pellicle film.

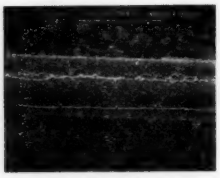
4,996,107
INK RESERVOIR CONTAINING MODIFIED POLYESTER FIBERS

Peter W. Raynolds, and Shriram Bagrodia, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 299,904, Jan. 23, 1989, Pat. No. 4,954,398, which is a division of Ser. No. 157,551, Feb. 16, 1988, Pat. No. 4,842,792. This application Jan. 29, 1990, Ser. No. 471,444

Int. Cl.[5] B32B *3/30*; B34K *5/02*; D02G *3/00*

U.S. Cl. 428—400 **16 Claims**



1. An ink reservoir for use with a writing instrument comprising a plurality of fibers wherein one or more individual fibers of said plurality of fibers is a fiber comprising a polyester material wherein said fiber has formed therein and extending along the length thereof at least one continuous groove, wherein the mean EB Roughness at the bottom of said groove is about 10% to about 600% higher than the mean EB Roughness outside said groove and the EB Roughness outside said groove is about 0.06μto about 0.20μ, and wherein said fiber has $L_1/L_2 > 1.2$, where L_1 and L_2 are the respective major and minor axes of the cross-section.

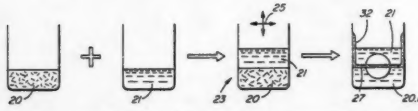
4,996,108
SHEETS OF TRANSITION METAL DICHALCOGENIDES

W. M. Ranjith Divigalpitiya; Robert F. Frindt, both of Vancouver, and S. Roy Morrison, Burnaby, all of Canada, assignors to Simon Fraser University, Burnaby, Canada

Filed Jan. 17, 1989, Ser. No. 297,464

Int. Cl.[5] B05D *1/18*

U.S. Cl. 428—411.1 **26 Claims**



1. A process for forming sheet-like compositions of the formula:

$$MX_2{:}Y$$

wherein MX_2 is a layer-type transition metal dichalcogenide, M is a metal selected from the group consisting of niobium, tantalum, molybdenum and tungsten, X is a chalcogen selected from the group consisting of sulfur and selenium and Y is a material located between layers of MX_2, which comprises the steps of:

(a) forming a suspension of MX_2 in a body of water;

(b) adding a non-metallic liquid which is immiscible with water to the suspension;

(c) agitating the mixture to form a temporary emulsion;

(d) allowing the emulsion to rest until the water and the immiscible liquid separate with an interface therebetween and a sheet-like composition of MX_2:Y forms at said interface.

4,996,109
HARD FOAM CORES FOR LAMINATES

Manfred Krieg, Darmstadt; Norbert Rau, Sulzbach, and Werner Ude, Darmstadt-Arheilgen, all of Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany

Filed Jul. 31, 1989, Ser. No. 387,931

Claims priority, application Fed. Rep. of Germany, Aug. 4, 1988, 3826469

Int. Cl.[5] B32B *3/26*

U.S. Cl. 428—304.4 **9 Claims**

1. A rigid foamed polymethacrylimide synthetic resin comprising from 0.1 to 10 percent by weight of electrically conductive particles.

9. A laminate comprising a core layer of a rigid foamed polymethacrylimide synthetic resin as in claim 1 and at least one further layer bonded to at least one side of said core layer.

4,996,110
WHITE BOARD

Itsuo Tanuma, Sayama; Hiromi Otsuru, and Toshio Honda, both of Akigawa, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Aug. 19, 1986, Ser. No. 897,951

Claims priority, application Japan, Sep. 20, 1985, 60-206644

Int. Cl.[5] B43L *1/00*

U.S. Cl. 428—343 **7 Claims**

1. A white board comprising; a front surface layer composed of a colored polyester film having undergone a hard coat treatment to provide a hard coat layer and, a rear surface layer composed of a magnetic sheet comprising a magnet in which a magnetic pressure sensitive adhesive composed of a pressure sensitive adhesive composition containing a ferromagnetic material is formed in a sheet, wherein said hard coat treatment is a treatment by which a surface of said transparent polyester film is treated with a hard coat treating agent consisting essentially of polysiloxane.

4,996,111
PROCESS FOR THE PRODUCTION OF A SOLDER COATING ON METALLIZED MATERIALS

Tha Do-Thoi, Röthenbach, and Klaus Popp, Nürnberg, both of Fed. Rep. of Germany, assignors to Hoechst CeramTec Aktiengesellschaft, Fed. Rep. of Germany

Division of Ser. No. 382,892, Jul. 20, 1989. This application Jan. 12, 1990, Ser. No. 464,021

Claims priority, application Fed. Rep. of Germany, Jul. 22, 1988, 3824900

Int. Cl.[5] B32B *15/00*

U.S. Cl. 428—432 **7 Claims**

1. A metallized ceramic part with an applied hard solder layer comprising a ceramic body on which there are successively located

(a) a thin metallizing layer of titanium, molybdenum or tungsten,

(b) a first layer selected from the group consisting of a layer of nickel or copper having a thickness of 0.5 to 5 μm and a layer of silver having a thickness of 1 to 70 μm, followed by

(c) at least one further layer of copper or silver having a thickness of 1–70 μm and having good adhesion, wherein the layers positioned side-by-side comprise in each case different metals, the layers located on the metallizing layer have a total layer thickness of 15–150 μm and the total amount of silver/copper is in the ratio 5:100 to 100:0.

4,996,112
STORAGE-STABLE ORGANOPOLYSILOXANE COMPOSITIONS MOISTURE-CURABLE INTO ELASTOMERIC STATE

Patrice Perrin, Lyons, and Andre Pierron, Lozanne, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Apr. 7, 1989, Ser. No. 334,691
Claims priority, application France, Apr. 7, 1988, 88 04849
Int. Cl.[5] B32B *9/04*
U.S. Cl. 428—447 **12 Claims**

1. An organopolysiloxane composition of matter that is storage-stable under anhydrous conditions, but curable into elastomeric state in the presence of moisture, which comprises

(A) 100 parts by weight of at least on α, ω-dihydroxy-diorganopolysiloxane polymer having a viscosity of 700 to 1,000,000 mPa.s at 25° C., comprising recurring diorganosiloxy structural units of the formula T_2Sio, in which the T radicals, which may be identical or different, are hydrocarbon radicals having from 1 to 10 carbon atoms, at least 50% of the number of such T radicals being methyl radicals;

(B) 0.5 to 20 parts by weight of at least one crosslinking agent comprising at least one ketiminoxysilane;

(C) 0.1 to 10 parts by weight of a bonding agent comprising admixture, or interreaction product of:

(i) an aminoorganosilicon compound C_1 bearing at least one amino functional group and comprising a primary amine substituent; and

(ii) an organosilicon compound C_2 bearing at least one epoxy functional group and having from 4 to 20 carbon atoms, in a ratio of 0.5 to 4 gram-equivalents of primary amino group in C_1 per one gram-equivalent of epoxy functional group in C_2;

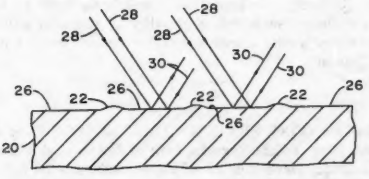
(D) 5 to 250 parts by weight of inorganic filler material; and

(E) 0.0004 to 3 parts by weight of a metal curring catalyst.

4,996,113
BRIGHTNESS ENHANCEMENT WITH TEXTURED ROLL

Louis G. Hector, Monroeville, and Shen S. Sheu, Murrysville, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Apr. 24, 1989, Ser. No. 342,300
Int. Cl.[5] B21D *53/00*; B21B *27/02*; B23K *26/00*
U.S. Cl. 428—600 **28 Claims**



1. In a method of rolling material between rotating rolls utilizing a lubricant and having an anisotropic working surface on at least one roll which comprises a topography of smooth bearing areas that roll the material under boundary lubrication conditions, said bearing areas being spaced apart by at least one micron size groove extending around and along the surface of the roll in the general direction of rolling to receive and conduct lubricant therealong, the method comprising:

polishing the working surface of said roll to a mirror finish before the groove is provided in the working surface of said roll,

providing said groove in said working surface,

removing material deposits from the working surface and banks of the groove by a second polishing operation without disturbing the topography of the groove,

coating the working surface and groove with a hard, dense material,

directing the material through the rotating rolls,

compressing the material between said rolls, and

imparting a reverse topography corresponding to the one roll to one surface of a product rolled from said material by said rolls.

4,996,114
ABRASION-RESISTANT COATING

David S. Darrow, Portville, N.Y., assignor to The Dexter Corporation, Windsor Locks, Conn.

Division of Ser. No. 231,155, Aug. 11, 1988. This application Jun. 13, 1989, Ser. No. 365,657
Int. Cl.[5] B05D *1/06*
U.S. Cl. 428—610 **3 Claims**

1. A process for preparing a coated substance comprising the steps of

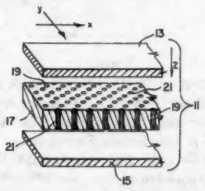
applying a coating comprising abrasion-resistant particles protruding from the surface of a metal matrix to a substrate under conditions sufficient to bond said coating to said substrate; and

hardening said surface of said metal matrix surrounding said particles by treating said surface to form a boride, carbide, nitride, or carbonitride of said metal.

4,996,115
COMPOSITE STRUCTURE

Thijs Eerkes, Oakville; Carlos M. Diaz, Mississauga, and James A. E. Bell, Oakville, all of Canada, assignors to Inco Limited, Toronto, Canada

Continuation-in-part of Ser. No. 462,624, Dec. 20, 1989, abandoned. This application Apr. 2, 1990, Ser. No. 502,990
Claims priority, application Canada, Dec. 23, 1988, 587036
Int. Cl.[5] B32B *3/24, 15/20*
U.S. Cl. 428—614 **4 Claims**



1. A composite structure having a linear thermal coefficient of expansion of about 5 to 12 ppm/°C. and comprising a thin metallic body extended in at least one of width or length comprising two outer layers of metal of high electrical and heat conductivity sandwiching a thin, coextensive inner layer of low coefficient of thermal expansion metal, said inner layer having a multiplicity of essentially uniformly distributed paths of said metal of high electrical and heat conductivity extending therethrough and connected to and integral with said two outer layers of said metal of high electrical and heat conductivity, said composite structure being so constructed and arranged that

(A) the paths of said metal of high electrical and heat conductivity through said inner layer comprise about 15 to 40 volume percent of said inner layer;

(B) the thicknesses of said outer layers of said metal of high electrical and heat conductivity (K) being controlled to provide thermal and electrical conductivity along said length and breadth (x—y) of said composite related to said conductivities across the thickness of (z) said composite such that

$$\frac{K_{x-y}}{K_z} = 0.9 \text{ to } 2.0 \text{ and}$$

(C) the overall volume fraction of said metal of high electrical and heat conductivity in said composite is such to provide a linear coefficient of thermal expansion within the aforesaid range,

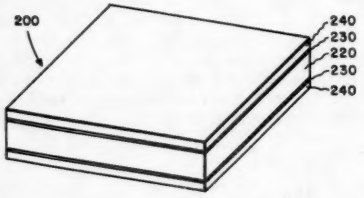
---

4,996,116

ENHANCED DIRECT BOND STRUCTURE

Harold F. Webster, Scotia; Constantine A. Neugebauer, and James F. Burgess, both of Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 21, 1989, Ser. No. 454,547
Int. Cl.[5] B32B *15/00, 15/04*
U.S. Cl. 428—627 49 Claims



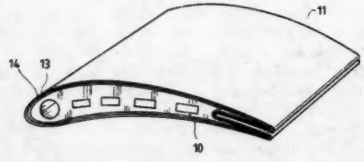
1. In combination:
a substrate;
a eutectic/substrate-wetting enhancement layer selected from the group consisting of platinum, palladium, gold and platinum, palladium or gold containing mixtures or alloys adhered to said substrate;
a metal-metal compound eutectic selected from the group consisting of copper-copper oxide, nickel-nickel oxide, cobalt-cobalt oxide, iron-iron oxide and copper-copper sulfide bonded to said eutectic/substrate-wetting enhancement layer.

4,996,117

HIGH TEMPERATURE PROTECTIVE COATING

Wing F. Chu, Leimen, and Franz J. Rohr, Absteinach, both of Fed. Rep. of Germany, assignors to BBC Aktiengesellschaft, Brown, Boveri & Cie, Baden, Switzerland

Continuation of Ser. No. 183,388, Apr. 13, 1988, abandoned, which is a continuation of Ser. No. 939,565, Dec. 9, 1986, abandoned. This application Sep. 25, 1989, Ser. No. 412,583
Claims priority, application Fed. Rep. of Germany, Dec. 12, 1985, 3543802
Int. Cl.[5] B32B *18/00;* C04B *35/48*
U.S. Cl. 428—633 4 Claims



1. A structural component consisting essentially of a super alloy having a high temperature protective coating, said coating, essentially consists of a ceramic material of 93–42 mole % of the oxide of zirconium, mixed with 2–8 mole % of yttrium oxide, for forming a stabilized zirconium oxide crystal combination, said combination, additionally being mixed with 5–50 mole % of zirconium silicate, said mixture being ground and sintered at a temperature between 1450° C. and 1500° C. to form a corrosion-resistant envelope around the stabilized zirconium oxide crystals and coated onto said super alloy substrate.

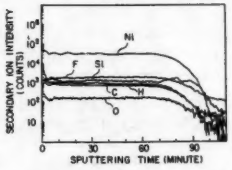
4. A structural component consisting essentially of a super alloy having a high temperature protective coating, essentially consisting of a ceramic material of 92–55 mole % zirconium oxide, mixed with 3–15 mole % of magnesium oxide, for forming a stabilized zirconium oxide and magnesium oxide combination, said combination being additionally mixed with an amount of corrosion-resistant aluminum titanate, wherein the amount of Al_2O_3 is between 3 and 18 mole % and the amount of TiO_2 is between 2 and 12 mole %, and being sufficient to impart corrosion resistance to said combination said mixture being ground and sintered at a temperature between 1450° C. and 1500° C. to form a corrosion-resistant envelope substantially surrounding said stabilized zirconium oxide combination and coated onto said super alloy substrate.

4,996,118

COMPOSITE METAL PLATED ARTICLE EXCELLENT IN MOLD-RELEASABILITY

Akiyoshi Okado; Masaki Abe; Hiroshi Kagechika, and Shinichi Kagaya, all of Tokyo, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed May 25, 1990, Ser. No. 528,935
Claims priority, application Japan, Jun. 22, 1989, 1-159892
Int. Cl.[5] B32B *15/00, 15/01, 15/04*
U.S. Cl. 428—639 7 Claims



1. In a composite metal plated article excellent in mold-releasability, which comprises an article to be plated and a composite metal plating layer, formed on at least one surface of said article to be plated, in which particles of a synthetic resin as a mold-releasing agent are uniformly dispersed,
the improvement characterized in that:
said synthetic resin comprises a modified silicone oil having a structure in which a plurality of repeated units of a fluorine atoms substituted olefin are combined with silicone oil.

4,996,119

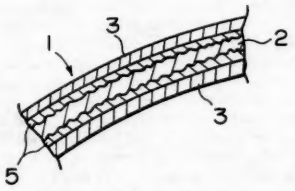
SPEAKER CONE PLATE AND METHOD OF FORMING

Yutaka Mae; Yoichi Yaguchi, both of Tokyo, and Masakatsu Sakamoto, Hachiohji, all of Japan, assignors to Kabushiki Kaisha Kenwood, Tokyo, Japan

Continuation-in-part of Ser. No. 129,910, Dec. 7, 1987, abandoned, which is a continuation of Ser. No. 768,342, Aug. 22, 1985, abandoned. This application Mar. 17, 1989, Ser. No. 325,040
Claims priority, application Japan, Aug. 27, 1984, 59-176599; Aug. 27, 1984, 59-176600
Int. Cl.[5] B32B *15/04;* G10K *13/00;* B29C *43/10;* B05D *3/02*
U.S. Cl. 428—469 8 Claims

1. A speaker diaphragm comprising a laminate treated by a hot isostatic press, including an inorganic surfacial hard layer on at least one face of a metal diaphragm substrate which has a higher density and a higher resultant effective ratio of E/ρ than would an unpressurized and unheated laminate composition, wherein said inorganic surfacial hard layer is selected from the group consisting of carbides, borides, or phosphides

and is reinforced together with said metal diaphragm substrate by hot isostatic pressing; said surfacial hard layer being formed



on said metal diaphragm substrate by plasma thermal spraying of an inorganic material, said inorganic material containing whiskers of silicon nitride or silicon carbide.

4,996,120

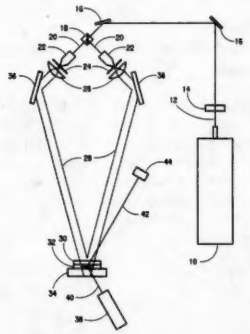
HOLOGRAPHIC PHOTOPOLYMER COMPOSITIONS AND ELEMENTS CONTAINING A RING-OPENING MONOMER

William K. Smothers, Hockessin; Bruce M. Monroe, and Dominic M. Chan, both of Wilmington, all of Del., assignors to E. I. DuPont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 291,582, Dec. 19, 1988. This application May 16, 1990, Ser. No. 524,228

Int. Cl.[5] G03H *1/04*

U.S. Cl. 430—2 **29 Claims**



1. A substantially solid composition that contains a volume reflection hologram formed by exposing to actinic radiation a composition consisting essentially of:

(a) 25 to 75% of a solvent soluble, thermoplastic polymeric binder;

(b) 5 to 60% of a monomer capable of addition polymerization, said monomer having a boiling point above 100° C. and polymerizing via free radical ring-opening sigma-bond cleavage; and

(c) 0.1 to 10% of a photoinitiator system that activates free radical polymerization of said monomer on exposure to actinic radiation;

wherein said percentages are weight percentages of the total composition.

16. An element comprising a substrate that supports a volume reflection hologram formed by exposing to actinic radiation a substantially solid, photopolymerizable composition consisting essentially of:

(a) 25 to 75% of a solvent soluble, thermoplastic polymeric binder;

(b) 5 to 60% of a monomer capable of addition polymerization, said monomer having a boiling point above 100° C. and polymerizing via free radical ring-opening sigma-bond cleavage; and

(c) up to 25% of a plasticizer; and

(d) 0.1 to 10% of a photoinitiator system that activates free radical polymerization of said monomer on exposure to actinic radiation;

wherein said percentages are weight percentages of the total composition.

4,996,121

ELECTROPHOTOGRAPHIC LITHOGRAPHIC PRINTING PLATE PRECURSOR CONTAINING RESIN HAVING HYDROXY GROUP FORMING FUNCTIONAL GROUP

Eiichi Kato, and Kazuo Ishii, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 4, 1989, Ser. No. 293,400

Claims priority, application Japan, Jan. 6, 1988, 63-265; Jan. 27, 1988, 63-14577

Int. Cl.[5] G03G *5/087*

U.S. Cl. 430—87 **10 Claims**

1. An electrophotographic lithographic printing plate precursor comprising a conductive support having provided thereon at least one photoconductive layer containing photoconductive zinc oxide and a resin binder, wherein said resin binder comprises at least one resin (A) containing at least one functional group capable of forming at least one hydroxyl group upon decomposition by treatment with an oil-desensitizing solution or dampening water and at least one member selected from group (B) consisting of a heat- and/or photo-curable resin (B) and a crosslinking agent (B).

4,996,122

METHOD OF FORMING RESIST PATTERN AND THERMALLY STABLE AND HIGHLY RESOLVED RESIST PATTERN

Richard M. Lazarus, Mission Viejo; Edward J. Reardon, Laguna Niguel, Calif., and Sunit S. Dixit, Mission Viejo, all of Calif., assignors to Morton International, Inc., Chicago, Ill.

Division of Ser. No. 376,971, Jul. 6, 1989, Pat. No. 4,943,511, which is a continuation of Ser. No. 229,088, Aug. 5, 1988, abandoned, which is a continuation-in-part of Ser. No. 175,706, Mar. 31, 1988, abandoned. This application Mar. 20, 1990, Ser. No. 496,240

Int. Cl.[5] G03F *7/023, 7/30*

U.S. Cl. 430—17 **17 Claims**

1. A method of forming a resist pattern on a substrate comprising:

1. coating said substrate with a layer of a positive photoresist composition;

2. exposing said layer patternwise to actinic radiation; and

3. removing the exposed portion of said layer with an aqueous alkaline developer for the exposed resist composition to uncover the areas of the substrate beneath the exposed portions; said positive photoresist comprising, prior to exposure, an admixture of a 1,2-naphthoquinonediazide photosensitizer and a bindingly effective amount of a novolak resin wherein:

A. said photosensitizer comprises an admixture of

2,3,4-trihydroxybenzophenone-1,2-naphthoquinone-2-diazo-4-sulfonic acid triester;

2,3,4-trihydroxybenzophenone-1,2-naphthoquinone-2-diazo-4-sulfonic acid diester, and

2,3,4-trihydroxybenzophenone-1,2-naphthoquinone-2-diazo-4-sulfonic acid monoester in the following relative amounts:

triester—about 50 wt % to about 75 wt %

monoester and diester—balance, in a monester/diester weight ratio of about $\frac{1}{3}$, said wt % being based on the total weight of the mono-, di-, and triester; and

B. said novolak resin comprises a resin selected from the group consisting of:

1. a resin prepared by condensing an aliphatic aldehyde,

aromatic aldehyde or mixture thereof with a phenolic component comprising a mixture of p-cresol and m-cresol containing at least about 60 weight percent p-cresol, based on the total weight of p-cresol and m-cresol, and a sufficient amount of m-cresol to render said novolak resin soluble in a aqueous, alkaline solution, said phenolic component being essentially free of o-cresol; and

2. a novolak resin which is the condensation product of (a) a mixture of m-cresol and p-cresol and (b) a mixture of formaldehyde or a formaldehyde precursor and a monohydroxy aromatic aldehyde selected from the group consisting of
2-hydroxybenzaldehyde,
3-hydroxybenzaldehyde and
4-hydroxybenzaldehyde.

10. A substrate coated with a thermally stable and highly resolved, exposed resist pattern, said resist pattern being formed from a positive photoresist composition which, prior to exposure to actinic radiation, comprises:

A. a photosensitizer comprising an admixture of
2,3,4-trihydroxybenzophenone-1,2-naphthoquinone-2-diazo-4-sulfonic acid triester;
2,3,4-trihydroxybenzophenone-1,2-naphthoquinone-2-diazo-4-sulfonic acid diester, and
2,3,4-trihydroxybenzophenone-1,2-naphthoquinone-2-diazo-4-sulfonic acid moester in the following relative amounts:
triester—about 50 wt % to about 75 wt %
moester and diester—balance, in a moester/diester weight ratio of about $\frac{1}{4}$, said weight being based on the total weight of the mono-, di-, and triester; and

B. a novolak resin comprising a resin selected from the group consisting of:

1. a resin prepared by condensing an aliphatic aldehyde, aromatic aldehyde or mixture thereof with a phenolic component comprising a mixture of p-cresol and m-cresol containing at least about 60 weight percent p-cresol, based on the total weight of p-cresol and m-cresol, and a sufficient amount of m-cresol to render said novolak resin soluble in an aqueous, alkaline solution, said phenolic component being essentially free of o-cresol; and

2. a novolak resin which is the condensation product of (a) a mixture of m-cresol and p-cresol and (b) a mixture of formaldehyde or a formaldehyde precursor and a monohydroxy aromatic aldehyde selected from the group consisting of 2-hydroxybenzaldehyde, 3-hydroxybenzaldehyde and 4-hydroxybenzaldehyde.

4,996,123

OPTICALLY ORIENTED PHOTORESIST PATTERN FORMING METHOD USING ORGANIC CRYSTAL IN PHOTORESIST LAYER WITH SPECIFIED REFRACTING INDICES FORMULA

Noboru Nomura, Kyoto; Atsushi Ueno, Hirakata; Kazuhiko Hashimoto, Moriguchi, and Satoshi Kinoshita, Tokyo, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Division of Ser. No. 72,120, Jul. 10, 1987, abandoned. This application Feb. 24, 1989, Ser. No. 326,414

Claims priority, application Japan, Jul. 11, 1986, 61-164052; Jul. 11, 1986, 61-164053; Jul. 11, 1986, 61-164054; Jul. 11, 1986, 61-164089

Int. Cl.[5] G03F *7/30*

U.S. Cl. 430—20 **7 Claims**

1. A resist pattern forming method comprising the steps of:

disposing an optically oriented photoresist layer on a substrate in such a manner that orientation of said photoresist layer is normal to a surface of said substrate, said optically oriented photoresist being composed of an organic polymer with a refractive index n_p, an organic crystal with a refractive index n_x, and a photosensitizer, wherein the relationship between said refractive indices n_x and n_p is expressed by the formula $n_x^2 - n_p^2 > (NA_o)^2$ for the numerical aperture NA_o of a projection lens employed for photolithographic exposure;

irradiating said surface of said photoresist layer with incident light through a photomask, whereby said incident light is propagated through said photoresist layer to the bottom of said layer without scattering; and

developing said photoresist layer to form a resist pattern.

5. A resist pattern forming method comprising the steps of:

disposing an optically oriented photoresist layer on a substrate in such manner that orientation of said resist is normal to a surface of said substrate, said optically oriented photoresist being composed of a low molecular organic crystal with a refractive index n_x, a high molecular organic crystal with a refractive index n_p, and photosensitizer, wherein the relationship between said refractive indices n_x and n_p is expressed by a formula $n_x^2 - n_p^2 > (NA_o)^2$ for a numerical aperture NA_o of a projection lens employed for photolithographic exposure;

irradiating said surface of said oriented photoresist layer with incident light through a photomask, whereby said incident light is propagated through said photoresist layer to the bottom of said layer without scattering; and

developing said photoresist layer to form a resist pattern.

4,996,124

PHOTOCONDUCTOR ELEMENT, REGENERATING METHODS AND ELEMENTS USEFUL THEREIN

Albert V. Buettner, Rochester; Rodney R. Bucks, and Lawrence E. Contois, both of Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 16, 1989, Ser. No. 437,490

Int. Cl.[5] G03G *5/047*

U.S. Cl. 430—59 **6 Claims**

1. A photoconductor element of interbonded successive layers comprising:

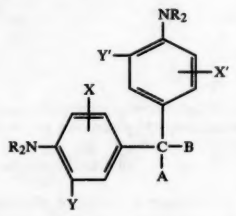
(a) a substrate;

(b) an electrically conductive, hole injecting layer;

(c) a charge transport layer comprising at least one organic photoconductor dissolved in a binder polymer; and

(d) a charge generating layer comprising a dye sensitized photoconductor dissolved in a binder polymer;

wherein said organic photoconductor is selected from the class of compounds having the formula:



wherein

R is selected from the group consisting of alkyl, aralkyl and substituted and unsubstituted aryl;

X and X', which may be the same or different, are selected from the group consisting of hydrogen, alkyl, alkoxy, hydroxy, NO_2 and halogen;

Y and Y', which may be the same or different, are selected from the group consisting of hydrogen, alkyl, alkoxy, hydroxyl, halogen and NO_2;

A and B, when taken alone may be the same or different, are selected from the group consisting of hydrogen, alkoxy, hydroxyl, halogen, substituted or unsubstituted aryl, alkyl, cycloalkyl having four to ten carbon atoms, and cycloalkenyl having four to eight carbon atoms; or

A and B, when taken together, represents sufficient atoms to

form together with the carbon to which they are attached a substituted or unsubstituted carbocyclic ring having from 4 to 10 carbon atoms;

wherein each said organic photoconductor may be present in said layer up to the limit of its solubility int he binder; and

wherein A and/or B in at least one of said photoconductors is substituted or unsubstituted aryl.

4,996,125

ELECTROPHOTOGRAPHIC PHOTORECEPTOR CONTAINING A FLUORINE LUBRICATING AGENT LAYER

Yasuo Sakaguchi; Ichiro Takegawa; Makoto Takemoto, and Masanori Murase, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Jan. 4, 1989, Ser. No. 293,282

Claims priority, application Japan, Jan. 7, 1988, 63-000725

Int. Cl.[5] G03G *5/14*

U.S. Cl. 430—66 **7 Claims**

1. An electrophotographic photoreceptor comprising an electrically conductive substrate having thereon a photosensitive layer, wherein a fluorine-containing lubricating agent layer comprising a fluorine-containing lubricating agent selected from perfluoroalkyl polyether or a derivative thereof and having a thickness in the range of from 100 to 5000 angstroms is provided on the surface of said photosensitive layer, said perfluoroalkyl polyether or derivative thereof having at least one functional group at the end carbon atom, said functional group being a member selected from the group consisting of $-COOR^2$ (R^2 being an alkyl group having from 1 to 5 carbon atoms); -COOH; $-CH_2OH$; and $-CONH-C_6H_3(CH_3)-NCO$, and said perfluoroalkyl polyether or derivative thereof having a molecular weight in the range of from 1,500 to 7,500 is represented by the formula (I):

$$-(CFR^1-CF_2-O)_n- \quad (I)$$

in which R^1 represents F, CF_3 or CH_3, and n represents an integer.

4,996,126

DEVELOPER HAVING SPECIFIC SPHERIODICITY

Masahiro Anno, and Eiichi Sano, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jan. 18, 1989, Ser. No. 299,551

Claims priority, application Japan, Jan. 20, 1988, 63-10246

Int. Cl.[5] G03G *9/093, 9/107*

U.S. Cl. 430—106.6 **19 Claims**

1. A two-component developer containing toner particles and carrier particles wherein the toner particles have spheroidicity of 150 or less, mean particle size of 14 μm or less and coefficient of variation of 15% or less, and the carrier particles have at least one of mean particle size of between 20 μm and 70 μm and spheroidicity of 140 or more, said coefficient of variation defined as:

coefficient of variation (%)=$(\sigma/x)\times 100$ wherein a standard deviation value (σ) is represented by the following formula:

$$\sigma = \sqrt{\frac{(X_1 - \bar{X})^2 + (X_2 - \bar{X})^2 + \cdots (Xn - \bar{X})^2}{n-1}} = \sqrt{\frac{1}{n-1}\left[\Sigma Xi^2 - \frac{(\Sigma Xi)^2}{n}\right]}$$

wherein x_1, x_2---, x_n represent respective particle sizes of sample particles, x represents the mean value of the n particle sizes.

4,996,127

TONER FOR DEVELOPING AN ELECTROSTATICALLY CHARGED IMAGE

Yukinobu Hasegawa; Hiroyoshi Shimomura, both of Hiratsuka; Koichi Murai, Fujisawa; Masatoshi Maruyama, and Toyokichi Tange, both of Hiratsuka, all of Japan, assignors to Nippon Carbide Kogyo Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP88/00073, § 371 Date Sep. 23, 1988, § 102(e) Date Sep. 23, 1988, PCT Pub. No. WO88/05930, PCT Pub. Date Aug. 11, 1988

PCT Filed Jan. 29, 1988, Ser. No. 261,829

Claims priority, application Japan, Jan. 29, 1987, 62-17378; May 15, 1987, 62-116797; May 15, 1987, 62-116798

Int. Cl.[5] G03G *9/00, 5/00*

U.S. Cl. 430—109 **20 Claims**

1. A toner for developing an electrostatically charged image, composed of associated particles of secondary particles comprising primary particles of a polymer having an acidic or basic polar group and particles of a coloring agent and optionally a charge controlling agent.

4,996,128

RECHARGEABLE BATTERY

Julio A. Aldecoa, Santa Cruz County, and Lawrence F. Miller, Santa Clara County, both of Calif., assignors to Nova Manufacturing, Inc., Scotts Valley, Calif.

Filed Mar. 12, 1990, Ser. No. 492,995

Int. Cl.[5] H01M *2/00*

U.S. Cl. 429—153 **19 Claims**

1. A rechargeable battery comprising:

a first plate formed of a first sheet of substantially solid metallic foil;

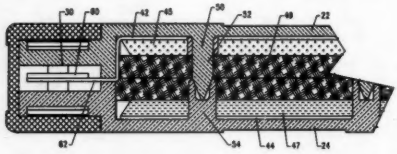
a second plate formed of a second sheet of substantially solid metallic foil;

a first active paste material applied to said first plate;

a second active paste material applied to second to said second plate, the second paste material being charged opposite the first paste material;

a separator for isolating the first and second paste materials; and

reinforcing means for maintaining a substantially constant spacing between said plates during operation and recharging of the battery; and a casing for enclosing said plates, separator and active materials, the casing providing support for said plates and wherein said reinforcing means includes a plurality of pins extending between opposite sides of said casing through said foil plates.



4,996,129

BATTERY

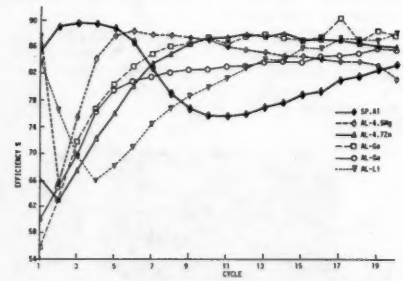
Clive D. S. Tuck, Banbury, England, assignor to Alcan International Limited, Montreal, Canada

Filed Dec. 29, 1988, Ser. No. 291,743

Claims priority, application United Kingdom, Jan. 5, 1988, 8800082

Int. Cl.[5] H01M *4/04, 10/40*

U.S. Cl. 429—194 **9 Claims**



1. A lithium battery having a lithium-based anode of aluminium alloy containing 3–25 volume % of dispersed particles with an average size in the range 0.05–2 microns.

4,996,130

SILVER HALIDE PHOTOGRAPHIC MATERIAL

Shuzo Suga; Masaki Satake, and Senzo Sasaoka, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 284,010, Dec. 13, 1988, abandoned. This application Mar. 13, 1990, Ser. No. 492,212

Claims priority, application Japan, Dec. 15, 1987, 63-316972

Int. Cl.[5] G03C *1/08, 1/04*

U.S. Cl. 430—264 **4 Claims**

1. A negative type silver halide photographic material which comprises:

a support having thereon at least one silver halide emulsion layer and at least one other hydrophilic colloidal layer, wherein

said at least one said silver halide emulsion layer or said at least one said other hydrophilic colloidal layer contains a hydrazine derivative and a

polyacrylamide derivative, wherein said polyacrylamide derivative has a weight average molecular weight of 2,000 to 50,000 and is present in an amount of from 0.1 to 1.5 g per m^2 of said photographic material and said hydrazine is present in an amount of from 1×10^{-5} to 2×10^{-2} mol per mol of silver halide.

4,996,131

OFFSET PLATE WITH THIN CHROMIUM LAYER AND METHOD OF MAKING

Jean-Marie Nouel, 67 rue Miromesnil, 75008 Paris, France (75008)

Continuation of Ser. No. 245,658, Sep. 15, 1988, Pat. No. 4,857,436, which is a continuation of Ser. No. 138,289, Dec. 28, 1987, abandoned, which is a continuation of Ser. No. 481,766, Apr. 4, 1983, abandoned, which is a continuation of Ser. No. 168,003, Jul. 14, 1980, abandoned. This application May 23, 1989, Ser. No. 356,379

The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.

Int. Cl.[5] G03C *1/77*

U.S. Cl. 430—276 **16 Claims**

1. A method of manufacturing an offset printing plate, comprising:

providing a hard, hydrophilic supporting base material of steel;

depositing a layer of dull, porous, ink-rejecting chromium directly onto the surface of the steel base material, said chromium layer having a thickness no greater than one micron and being sufficiently thin and porous to permit the desirable properties of hardness and hydrophilicity of the subjacent steel base material to manifest themselves through the chromium layer during printing, and sufficiently thin to permit removal of the chromium layer from a selected area of the offset printing plate by scraping to expose the subjacent surface of the steel base material; the step of depositing comprising the steps of:

immersing the hydrophilic steel base material in an electrolytic chromium plating solution for an initial period of time without applying a plating current;

maintaining the temperature of the plating solution at a temperature between 25° and 35° C.;

subsequently applying a plating current; and

cutting the current to produce the dull and porous chromium deposit having a thickness no greater than one micron; and

applying a layer of photosensitive resist material to the plate, said photosensitive resist material being hydrophobic and ink-receptive after insolation and being of sufficient thickness to substantially prevent oxidation of the steel base material through the porous chromium layer during the normal storage period of the offset printing plate prior to use.

4,996,132

HEAT-RESISTANT PHOTOSENSITIVE RESIN COMPOSITION

Kenji Tazawa; Akira Iwata; Tomoki Horigome, and Hiroyuki Tohda, all of Kanagawa, Japan, assignors to Toyko Ohka Kogyo Co. Ltd., Kanagawa, Japan

Filed Feb. 23, 1988, Ser. No. 159,622

Claims priority, application Japan, Feb. 25, 1987, 62-40140; Sep. 30, 1987, 62-243674

Int. Cl.[5] G03F *7/031*

U.S. Cl. 430—286 **21 Claims**

1. A heat resistant photosensitive resin composition which consists essentially of:

(a) a copolymer obtained by the copolymerization of a monomer mixture comprising from 10 to 30% by weight of an ethylenically unsaturated amide compound represented by the general formula

$$CH_2{=}CX{-}CO{-}NH{-}Y{-}OZ$$

in which x is a hydrogen atom or methyl group, Y is an alkylene group having 1 to 4 carbon atoms and Z is an alkyl group having 1 to 4 carbon atoms or a benzyl group as a first essential

monomer; from 10 to 30% by weight of an ethylenically unsaturated compound having at least one carboxyl group in a molecule as a second essential monomer; and 40 to 80% by weight of a third essential monomer of an ethylenically unsaturated compound selected from the group consisting of styrene, α-methyl styrene, methyl acrylate, methyl methacrylate, butyl acrylate, butyl methacrylate, hydroxymethyl acrylate, hydroxymethyl methacrylate, hydroxypropyl acrylate and hydroxypropyl methacrylate;

(b) an esterified resin which is a reaction product of a novolac-type epoxy resin and an ethylenically unsaturated carboxylic acid in an amount of above 0.8 to 1.1 equivalents relative to the epoxy groups in the novolac-type epoxy resin to esterify said resin so that the resultant product contains essentially no unreacted epoxy groups;

(c) a photopolymerizable monomer;

(d) a photopolymerization initiator; and

(e) a solid powder as a filler.

4,996,133

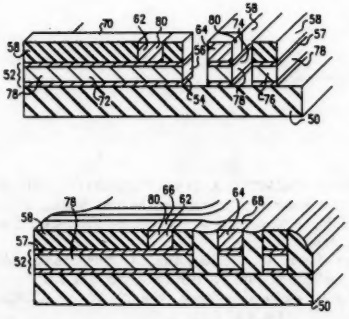
SELF-ALIGNED TUNGSTEN-FILLED VIA PROCESS AND VIA FORMED THEREBY

Jeffrey E. Brighton, Katy, and Douglas P. Verret, Sugarland, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 80,116, Jul. 31, 1987, Pat. No. 4,842,991. This application Dec. 23, 1987, Ser. No. 137,389

Int. Cl.[5] G03C *5/00*

U.S. Cl. 430—313 **19 Claims**



1. A method for fabricating a via through an insulator layer to a conductor, comprising the steps of:

forming a conductor layer on a support layer;

forming an insulator layer on the conductor layer;

opening an orifice in the insulator layer to the conductor layer;

filling the orifice with a conductive material such that an outer surface of the conductive material :s substantially coplanar with an outer surface of the insulator layer;

etching the insulator layer, the conductive material and the conductor layer to define a conductor that laterally intersects the orifice; and

insulating all surfaces of the conductor laterally outside of a via formed by the area of lateral intersection of the conductor and the orifice.

4,996,134

CONJUGATED DIENE COPOLYMER, A PROCESS FOR PRODUCING THE COPOLYMER, AND A PHOTOSENSITIVE COMPOSITION COMPRISING THE COPOLYMER

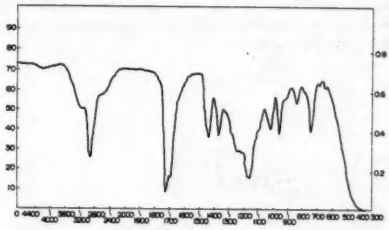
Hiroji Enyo, Suzuka; Shin-ichiro Iwanaga, and Yasuhiko Takemura, both of Yokkaichi, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

Filed Mar. 26, 1985, Ser. No. 716,206

Claims priority, application Japan, Apr. 13, 1984, 59-74546; Oct. 17, 1984, 59-216367

Int. Cl.[5] C08F *265/02, 265/06, 265/08, 2/50*

U.S. Cl. 430—286 **26 Claims**



1. A photosensitive composition, comprising a random copolymer (I), a photopolymerizable unsaturated monomer (ii), and a photosensitizer (III);

wherein said random copolymer (I) is a conjugated diene random copolymer comprising:

(A) 10–60 mole % of a conjugated diene compound unit;

(B) 5–50 mole % of an α,β-ethylenically unsaturated carboxylic acid unit;

(C) 0.1–20 mole % of a non-conjugated polyfunctional alkenyl compound unit which is (C_1) ethylene glycol dimethacrylate, ethylene glycol diacrylate, trimethylolpropane trimethacrylate, propylene glycol dimethacrylate, or propylene glycol diacrylate, (C_2) divinylbenzene or (C_3) a trivinylbenzene;

(D) 0–10 mole % of a non-conjugated diene compound unit having cyclic carbon-carbon double bonds; and

(E) 0–80 mole % of a monoolefinically unsaturated compound unit other than one from (B) above, wherein the sum of the amount of (A), (B), (C), (D) and (E) is 100 mole %, and said random copolymer has an intrinsic viscosity of 0.01 to 3.0 dl g^{-1} as measured at 30° C. in dimethylformamide.

4,996,135

DESENSITIZING GUM LITHOGRAPHIC PLATE FINISHER

Tadao Toyama; Kenji Kunichika, both of Shizuoka; Norio Hishiki, and Masahiro Nishida, both of Osaka, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Filed Oct. 23, 1989, Ser. No. 425,034

Claims priority, application Japan, Oct. 24, 1988, 63-267543

Int. Cl.[5] G03F *7/00*

U.S. Cl. 430—309 **20 Claims**

1. A gumming-up process comprising applying to an imagewise exposed and developed presensitized plate, a desensitizing gum lithographic plate finish which comprises water-soluble starch modified with urea-phosphoric acid, containing 0.01 to 3% by weight of bound phosphorus and having a viscosity determined on 20% by weight aqueous solution at 30° C. ranging from 15 to 300 cps.

4,996,136

RADIATION SENSITIVE MATERIALS AND DEVICES MADE THEREWITH

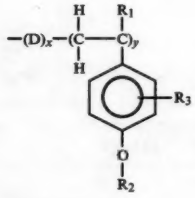
Francis M. Houlihan, North Plainfield; Elsa Reichmanis, Westfield, and Larry F. Thompson, Millington, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 160,368, Feb. 25, 1988, abandoned. This application Feb. 24, 1989, Ser. No. 316,051

Int. Cl.[5] G03C 5/58

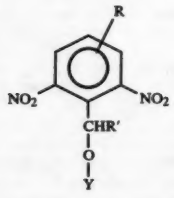
U.S. Cl. 430—313 21 Claims

1. A process for fabricating a device comprising the steps of forming a radiation sensitive region on a substrate, exposing said region to said radiation to form a pattern, developing said pattern, and employing said pattern to define areas of said device, characterized in that said radiation sensitive region comprises a material including (1) a polymer composition represented by the formula:

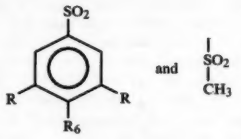


where R_1 is chosen from the group consisting of H, lower alkyl ad lower alkyl derivatives, where D comprises a backbone scission inducing moiety located in said backbone, where R_3 is chosen from the group consisting of H, Cl, Br, lower alkyl, and lower alkyl derivatives, where R_2 is chosen such that the O—R_2 bond cleaves in the presence of acid to form a carbonium ion that is sufficiently stable to eliminate an available α-hydrogen, and where x and y indicate the relative proportions of said scission moiety to chain moiety without implying ordering of moieties in the chain, and (2) a composition that results in generation of an acidic moiety as a result of irradiation with said radiation.

18. A process for fabricating a device comprising the steps of forming a radiation sensitive region on a substrate, exposing said region to said radiation to form a pattern, developing said pattern, and employing said pattern to define areas of said device, characterized in that said radiation sensitive region comprises a material including (1) a material that undergoes a reaction in response to an acidic moiety and (2) an acid generating material represented by the formula

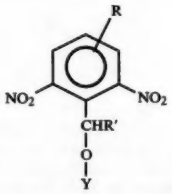


where R is not acidic, R′ comprises a member of the group consisting of H and CH_3 and Y comprises a member of the group consisting of



where R_6 comprises a member chosen from the group consisting of H and CH_3.

20. A process for fabricating a device comprising the steps of forming a radiation sensitive region on a substrate, exposing said region to said radiation to form a pattern, developing said pattern, and employing said pattern to define areas of said device, characterized in that said radiation sensitive region comprises a material including (1) a material that undergoes a reaction in response to an acidic moiety and (2) an acid generating material represented by the formula



where R is not acidic, R′ comprises a member of the group existing of H and CH_3 and Y is chosen such that it requires a temperature of at least 75° C. to cause its removal from the remainder of said acid generator.

4,996,137

METHOD FOR FORMING A DIRECT POSITIVE IMAGE

Noriyuki Inoue; Katsumi Hirano, and Mitsuo Saitou, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 236,100, Aug. 24, 1988, abandoned. This application Jun. 21, 1990, Ser. No. 541,170

Claims priority, application Japan, Aug. 24, 1987, 62-208241

Int. Cl.[5] G03C 5/24

U.S. Cl. 430—378 15 Claims

1. A method for forming a direct positive image comprising the step of developing with a surface developer an imagewise exposed photosensitive material comprising a support having thereon at least one photosensitive emulsion layer containing unprefogged silver bromide core/shell grains capable of forming an internal latent image; said at least one photosensitive emulsion layer comprising hexagonal tabular silver bromide core/shell grains in an amount of at least 30 wt %, based on the total silver amount of silver bromide grains therein; said hexagonal tabular grains having two parallel hexagonal faces, the ratio of the longest side to the shortest side of the hexagon being at most 2; the aspect ratio of said hexagonal tabular grains being from 2 to 8; and said hexagonal tabular grains having a monodisperse size distribution.

4,996,138

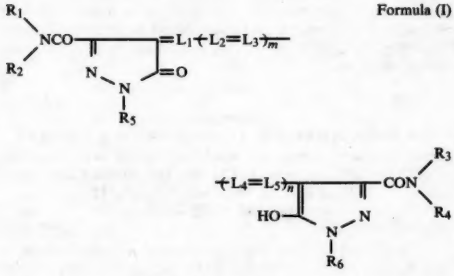
SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Kazuhiro Murai, Odawara; Yasuhiko Kawashima, Hino; Shun Takada, Odawara, and Nobuaki Kagawa, Hachioji, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Sep. 29, 1989, Ser. No. 414,711
Claims priority, application Japan, Oct. 4, 1988, 63-250713
Int. Cl.[5] G03C *1/06*
U.S. Cl. 430—522 10 Claims

1. A silver halide photographic light-sensitive material comprising a support and photographic layers containing at least one silver halide emulsion layer thereon, wherein at least one silver halide emulsion layer contains silver halide grains having a silver chloride content of not less than 90 mol% and silver bromide content of not less than 0.05 mol% and at least one of said photographic layer contains a compound represented by the following Formula (I)

Formula (I)



wherein R_1, R_2, R_3, R_4, R_5, and R_6 each represents a hydrogen atom, a substituted alkyl group, an unsubstituted alkyl group, a substituted aryl group, an unsubstituted aryl group, a substituted alkenyl group, an unsubstituted alkenyl group, a substituted heterocyclic group, or an unsubstituted heterocyclic group, provided that R_1 and R_2 are not a hydrogen atom at the same time, and provided that R_3 and R_4 are not a hydrogen atom at the same time, and at least one of R_1, R_2, R_3, R_4, R_5, and R_6 is a group having a water-soluble group or a group having a substituent having a water-soluble group, and L_1, L_2, L_3, L_4 and L_5 each represents a substituted methine group or an unsubstituted methine group and, m and n each is an integer of 0 or 1.

4,996,139

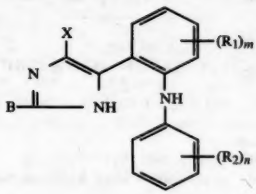
SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING NOVEL CYAN COUPLER

Toyoaki Masukawa; Takashi Uchida, and Noritaka Nakayama, all of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Aug. 1, 1989, Ser. No. 388,168
Claims priority, application Japan, Aug. 12, 1988, 63-202270
Int. Cl.[5] G03C *7/32, 1/10*
U.S. Cl. 430—558 6 Claims

1. A silver halide photographic light-sensitive material comprising a support and provided thereon a silver halide emulsion layer containing a cyan coupler represented by the following formula I:

(I)



wherein B is an organic group comprising a carbon atom, nitrogen atom, oxygen atom or sulfur atom directly bonded to the imidazole ring; R_1 and R_2 each are a substituent; m is an integer of 0 to 4, n is an integer of 0 to 5, provided that the groups represented by said R_1 or R_2 are respectively allowed to be the same with or different from each other when m or n is 2 or more,; and X is a group capable of being split off upon coupling reaction with the oxidation product of a color developing agent.

4,996,140

SILVER HALIDE PHOTOGRAPHIC MATERIAL

Tomoyuki Nakayama; Hiroyuki Hoshino; Hirofumi Ohtani, and Syoji Matsuzaka, all of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Jun. 6, 1989, Ser. No. 362,126
Claims priority, application Japan, Jun. 8, 1988, 63-140785
Int. Cl.[5] G03C *1/035, 1/10*
U.S. Cl. 430—569 22 Claims

1. A silver halide photographic material having silver halide emulsion layers, at least one of which contains a silver halide emulsion that has been prepared in such a way that a spectral sensitizing dye is added after 85 wt % of the soluble silver salt in solution that is to be added during ripening of silver halide emulsion has been added but before the start of a desalting step, and that a spectral sensitizing dye which may be the same or different from the first added dye is added during said desalting step wherein at least 50% of the total amount of the spectral sensitizing dye is added during the desalting step.

4,996,141

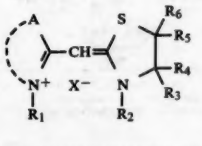
MONOMETHINE COMPOUNDS

Geoffrey E. Ficken, Wilmslow; Douglas J. Edwards, Warrington; Clive W. Mowforth, Wilmslow; Trevor J. Maternaghan, Knutsford, all of England; Rolf Steiger, Praroman, Switzerland, and Victor W. Dolden, Wilmslow, England, assignors to Ilford Limited, Cheshire, England

Filed Jan. 11, 1989, Ser. No. 295,795
Claims priority, application United Kingdom, Jan. 13, 1988, 8800662
Int. Cl.[5] G03C *1/16*
U.S. Cl. 430—583 10 Claims

1. A photographic silver halide negative working emulsion which comprises a monomethine compound of the general Formula I:

(I)



where A represents the atoms necessary to complete a benzoxazole or naphthoxazole ring which is optionally substituted, R_1 and R_2 are each alkyl, hydroxyalkyl or alkoxy alkyl groups wherein the alkyl moiety comprises 1 to 4 carbon atoms, R_3,

R_4, R_5 and R_6 are each hydrogen atoms or alkyl groups having 1 to 4 carbon atoms or phenyl groups, and X is an anion.

4,996,142
NON-RADIOACTIVE NUCLEIC ACID HYBRIDIZATION PROBES

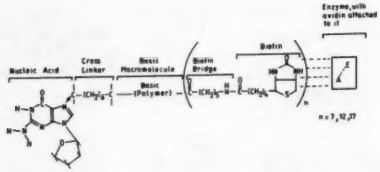
Ali H. Al-Hakim, and Roger Hull, both of Norwich, England, assignors to Agricultural Genetics Company Limited, Cambridge, England

Filed Sep. 4, 1987, Ser. No. 94,133

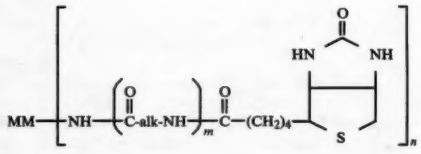
Claims priority, application United Kingdom, Sep. 4, 1986, 8621337

Int. Cl.[5] C12Q *1/68*; C07D *495/04*; C08H *1/02*; A61K *31/415*

U.S. Cl. 435—6 **6 Claims**



1. An adduct of a basic macromolecule and biotin having the formula:



wherein MM is the residue of a basic macromolecule selected from the group consisting of cytochrome C, histone and polyethyleneimine, formed by substituted the H-atom of one or more primary or secondary amino groups; alk represents an alkylene group having from 1 to 10 C-atoms; m is 0 or 1, and n is a positive integer from 1 to 30, with the proviso that, where MM represents cytochrome C or histone, m is not zero.

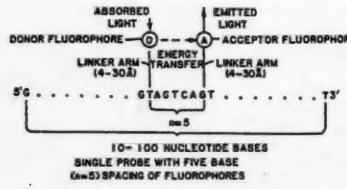
4,996,143
FLUORESCENT STOKES SHIFT PROBES FOR POLYNUCLEOTIDE HYBRIDIZATION

Michael J. Heller, Poway, and Edward J. Jablonski, San Diego, both of Calif., assignors to Syngene, Inc., San Diego, Calif.

Continuation of Ser. No. 315,218, Feb. 23, 1989, abandoned, which is a continuation of Ser. No. 812,111, Dec. 23, 1985, abandoned. This application Apr. 13, 1990, Ser. No. 511,834

Int. Cl.[5] C12Q *1/68*

U.S. Cl. 435—6 **29 Claims**



1. The spectroscopy method for detecting a target single-strand polynucleotide sequence in a polynucleotide sample in which either (i) a fluorescent polynucleotide single probe sequence complementary to said target sequence is hybridized thereto, or (ii) a plurality of probes of such sequences complementary to sequentially adjacent portions of said target sequences are hybridized thereto, wherein the improvement comprises having present in said single probe or in said plurality of probes at least one pair of fluorescent moieties connected by linker arms to nucleic acid base units, said fluorescent moieties comprising respectively donor and acceptor moieties selected so that the emission spectrum of the donor moiety overlaps the excitation spectrum of the acceptor moiety to permit non-radioactive energy transfer with efficient fluorescent emission by the acceptor fluorophores, the wavelength maximum of the emission spectrum of the acceptor moiety being at least 100 nm greater than the wavelength maximum of the excitation spectrum of the donor moiety, said linker arms having lengths of 4 to 30 Angstroms, the donor and acceptor moieties being connected to non-contiguous base units in said single probe or to base units in said plural probes other than 3' and 5' and units thereof, when said single probe or said plural probes are hybridized to the target sample the base units to which said donor and acceptor moieties are connected being paired through hybridization to base units of said target sequence which are separated by 2 to 7 intervening nucleotide base units of the target sequence.

4,996,144
MICROASSAY FOR DETECTION OF DNA AND RNA

Anne Crossway, Davis, and Catherine M. Houck, Vacaville, both of Calif., assignors to Calgene, Inc., Davis, Calif.

Filed Jan. 25, 1985, Ser. No. 694,715

Int. Cl.[5] C12Q *1/68*

U.S. Cl. 435—6 **7 Claims**

1. A method for detecting a nucleic acid sequence present in a cell population of fewer than 500 cells, said method comprising:

transferring an aqueous polyol suspension of cells to a paraffin oil and removing any excess of said aqueous polyol;

solubilizing said cells with a proteinase;

adding a phenolic extractant to extract cell debris away from the nucleic acid containing aqueous layer and into the phenolic layer;

adding an alkanolic chloroform solution, whereby the phenolic layer becomes dispersed into the paraffin oil;

transferring the remaining aqueous drop containing the nucleic acid to a substrate; and

detecting any of said aqueous bound to said substrate.

4,996,145
METHOD FOR DETECTING IMMUNE-MEDIATED CYTOTOXICITY

Larry M. Weisenthal, Huntington Beach, Calif., assignor to Oncotech Incorporated, Irvine, Calif.

Filed Oct. 27, 1987, Ser. No. 114,085

Int. Cl.[5] G01N *33/53*, *33/577*; C12Q *1/28*, *1/18*

U.S. Cl. 435—7.23 **20 Claims**

1. A method for evaluating in vitro the response of tumor cells from a human subject to the presence of an immune effector substance to predict response of the tumor cells in vivo to treatment with the effector substance, which method comprises:

(a) obtaining a sample from a subject containing fresh tumor cells and non-tumor cells including endogenous effector cells;

(b) exposing a portion of said sample of tumor and nontumor cells in vitro to an immune effector substance for a time effective to evaluate the response of said tumor cells to the presence of said effector substance by determining whether the tumor cells are killed and leaving a portion of said sample as a control untreated by said effector substance;

(c) adding an internal standard to each of said samples to verify that similar numbers of total cells are present;

(d) adding a dye excluded by living cells to stain cells killed by said immune effector substance;

(e) counterstaining said cells with a stain that indicates living cells to indicate the remaining living tumor cells from non-tumor cells in the sample exposed to said effector substance; and

(f) comparing the number of individual tumor cells surviving in the presence of the effector substance, with the numbers of individual tumor cells surviving in the absence of said effector substance, by counting cells able to exclude said dye excluded by living cells, and normalizing to said internal standard distinguishable from said tumor cells, whereby the number of tumor cells killed in response to the presence of said effector substance in vitro is determined and is used to predict the response in vivo of the tumor cells of said subject to said effector substance.

4,996,146

RAPID STERILIZATION ENZYMATIC PROCESS WITH PERSISTENCE

Jack H. Kessler, 23 Carriage House Path, Ashland, Mass. 01721

Continuation of Ser. No. 17,224, Feb. 20, 1987, abandoned. This application Mar. 5, 1990, Ser. No. 488,507

Int. Cl.[5] C12Q *1/28, 1/18;* A01N *25/00;* C12N *7/06*

U.S. Cl. 435—28 **7 Claims**

1. A method for sterilizing an aqueous-based medium containing pathogens consisting essentially of the steps of: selecting four components including a source of peroxide, a peroxidase selected from the class contained in the E.C. #1.11.1.7, a salt of iodide, and buffering means selected to render the pH of said aqueous-based medium between a pH of about 6.5 and 4.0; storing said four components in a nonreacting state and admixing the four components in said aqueous-based medium under conditions and for a time sufficient to cause a catalyzed reaction for generating sterilizing agents from said source of iodide to sterilize said aqueous-based medium.

4,996,147

PROCESS FOR PRODUCING L-THREONINE BY FERMENTATION

Satoru Furukawa, and Toshihide Nakanishi, both of Hofu, Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Filed Jul. 28, 1988, Ser. No. 225,385

Claims priority, application Japan, Jul. 31, 1987, 62-192303

Int. Cl.[5] C12P *13/08, 15/00;* C12N *1/20*

U.S. Cl. 435—115 **3 Claims**

1. A process for producing L-threonine by fermentation which comprises culturing in a medium *Escherichia coli* FERM BP-1411 having resistance to rifampicin, lysine, methionine, aspartic acid and homoserine and an ability to produce L-threonine, until L-threonine is accumulated in the culture, and recovering L-threonine therefrom.

4,996,148

A80407 ANTIBIOTICS

Lawrence E. Doolin; Richard M. Gale, both of Indianapolis; Otis W. Godfrey, Greenwood; Robert L. Hamill, Greenwood; David F. Mahoney, Indianapolis, and Raymond C. Yao, Carmel, all of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Jul. 13, 1987, Ser. No. 72,323

Int. Cl.[5] C12P *17/18, 1/06, 21/04;* C12N *1/20*

U.S. Cl. 435—119 **9 Claims**

1. A process for producing antibiotic A80407 which comprises cultivating *Kibdelosporangium philippinensis* NRRL 18198 or NRRL 18199, or an A80407-producing mutant thereof, in a culture medium containing assimilable sources of carbon, nitrogen, and inorganic assimilable sources of carbon, nitrogen, and inorganic salts under submerged aerobic fermentation conditions until a recoverable amount of antibiotic A80407 is produced, and separating antibiotic A80407 from the culture medium.

4,996,149

MICROBIOLOGICAL HYDROXYLATION PROCESS OF QUININE, QUINIDINE AND DERIVATIVES THEREOF

Francois X. Jarreau, Versailles; Robert G. Azerad, Ris Orangis, and Thierry P. Ogerau, Voisins-le-Bretonneux, all of France, assignors to Nativelle S.A., Issy-les-Moulineaux Cedex, France

PCT No. PCT/FR86/00260, § 371 Date May 21, 1987, § 102(e) Date May 21, 1987, PCT Pub. No. WO87/00552, PCT Pub. Date Jan. 29, 1987

PCT Filed Jul. 22, 1986, Ser. No. 37,351

Claims priority, application France, Jul. 23, 1985, 85 11221

Int. Cl.[5] C12P *17/16, 17/12;* C12N *1/14*

U.S. Cl. 435—119 **5 Claims**

1. A process for the regiospecific and stereospecific hydroxylation of a compound selected from the group consisting of quinine, quinidine dihydroquinine, and dihydroquinidine, in position 3S, comprising incubation of said compound with the microorganism *Mucor plumbeus.*

4,996,150

BIOCATALYST IMMOBILIZATION IN A GEL OF ANIONIC POLYSACCHARIDE AND CATIONIC POLYMER

John J. Joung; Cavit Akin, both of Naperville, and Garfield P. Royer, Warrenville, all of Ill., assignors to Amoco Corporation, Chicago, Ill.

Continuation of Ser. No. 665,750, Oct. 29, 1984, abandoned. This application Apr. 25, 1988, Ser. No. 186,062

Int. Cl.[5] C12P *7/06;* C12N *11/10, 11/12, 11/08*

U.S. Cl. 435—161 **19 Claims**

1. A method of making a biocatalyst system which comprises the steps of:

mixing a biocatalytic entity with the reaction product of a homogeneous dispersion of an anionic polysaccharide polymer with a cationic polymer to form a polymer-biocatalyst dispersion;

mixing said polymer biocatalyst dispersion with an oil phase to form beads, and mixing a powder with the beads in the oil phase wherein the powder comprises a water soluble and oil insoluble multivalent cation salt and said powder acts to gell and dehydrate the beads and to prevent the beads from adhering to one another until individual bead surfaces become hardened whereby said biocatalyst system is provided aim.

4,996,151

METHOD FOR PRODUCING THE EAG I RESTRICTION ENDONUCLEASE AND METHYLASE

Joan E. Brooks, and Laura A. Sznyter, both of Beverly, Mass., assignors to New England Biolabs, Inc., Beverly, Mass.

Filed May 19, 1988, Ser. No. 195,882

Int. Cl.[5] C12N *15/54, 75/55, 1/20*

U.S. Cl. 435—172.3 **10 Claims**

1. Isolated DNA coding for the EagI restriction endonuclease, wherein the isolated DNA is obtainable from the vector pEagRM2.9.

4,996,152

AVIAN HERPESVIRUS AMPLICON AS A EUCARYOTIC EXPRESSION VECTOR

Jeanne K. Carter, Cincinnati, Ohio, and Robert F. Silva, Okemos, Mich., assignors to The United States of America, as represented by the Secretary of Agriculture, Washington, D.C.

Filed Dec. 4, 1987, Ser. No. 128,836
Int. Cl.[5] C12N *15/03*
U.S. Cl. 435—172.3 12 Claims

10. A method for amplifying a foreign gene comprising transfecting cells in the presence of a helper virus with a recombinant DNA vector comprising a substantially biologically pure amplicon derived from a Marek's disease virus and said foreign gene, wherein said amplicon contains all cis-acting functions required for DNA replication, and in the presence of helper virus, said amplicon infects host cells and replicates, thereby forming high molecular weight concatemers of DNA.

4,996,153

HEAT-STABLE, SALT-TOLERANT MICROBIAL XANTHANASE

Martin C. Cadmus, and Morey E. Slodki, both of Peoria, Ill., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 192,083, May 10, 1988, Pat. No. 4,886,746.
This application Aug. 29, 1989, Ser. No. 400,316
Int. Cl.[5] C12P *39/00;* C12N *9/42, 1/20;* C12R *1/01*
U.S. Cl. 435—209 3 Claims

1. A heat stable, salt-tolerant xanthanase contained in, or recovered from, a fermentation broth of a culture of NRRL B-18445 and characterized by the property of retaining approximately 100% of its original activity upon being heated at 55° C. for 20 minutes.

4,996,154

METHOD FOR GROWING CELLULAR TISSUE

Joseph E. Gabriels, Jr., Brighton, Mass., assignor to Millipore Corporation, Bedford, Mass.

Filed May 4, 1989, Ser. No. 347,448
Int. Cl.[5] C12N *5/06, 5/08*
U.S. Cl. 435—240.241 15 Claims

1. A method of producing tissue from keratinocyte cells, comprising the steps of:

a. contacting a collagen coated polymeric microporous substrate suitable for growing cells with growth factor specific for growth of said keratinocyte cells in vitro, wherein the collagen comprises activated sites for attaching the growth factors thereto;

b. subsequently seeding keratinocyte cells onto the microporous substrate; and

c. maintaining the seeded microporous substrate under conditions suitable for cell growth to thereby produce a confluent monolayer of tissue or uniformly differentiated multilayer tissue.

4,996,155

BACILLUS THURINGIENSIS GENE ENCODING A COLEOPTERAN-ACTIVE TOXIN

August J. Sick, and Thomas E. Gilroy, both of San Diego, Calif., assignors to Mycogen Corporation, San Diego, Calif.

Filed Mar. 4, 1988, Ser. No. 164,044
Int. Cl.[5] A01N *63/00;* C12N *1/13, 1/15, 1/21*
U.S. Cl. 435—252.3 23 Claims

1. Essentially pure DNA encoding a *B.t.* toxin having the amino acid sequence shown in FIG. 2.

4,996,156

PREPARATION OF SPORE-FREE, CONCENTRATED PROTEIN PREPARATIONS FROM *BACILLUS THURINGIENSIS* SEROVAR, *ISRAELENSIS,* WHICH IS TOXIC FOR GNATS, A MICROORGANISM FOR THEIR PREPARATION, AND THE ISOLATION OF THE MICROORGANISM

Hans Zaehner, 13 Im Hopfengarten; Konrad Bernhard, 132 Jessinger Hauptstrasse, both of 7400 Tuebingen, and Harald Weisser, 80 Bruggerstrasse, 7210 Rottweil, all of Fed. Rep. of Germany

Filed Mar. 6, 1987, Ser. No. 22,830
Int. Cl.[5] C12R *1/07;* C12P *21/00;* A01N *63/00;* C12N *15/01*
U.S. Cl. 435—252.5 4 Claims

1. *Bacillus thuringiensis* serovar. *israelensis* SM 3439.
2. *Bacillus thruingiensis* serovar. *israelensis* SM 3440.

4,996,157

BIOLOGICAL CONTROL OF PHYTOPHTHORA BY TRICHODERMA

Victoria L. Smith; Wayne F. Wilcox, and Gary E. Harman, all of Geneva, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed Nov. 14, 1988, Ser. No. 271,143
Int. Cl.[5] C12N *1/14;* A01N *63/04*
U.S. Cl. 435—254 5 Claims

1. A biocontrol agent effective against *Phytophthora cactorum* selected from the group consisting of:

Gliocladium virens, 031 (ATCC 20903);

Gliocladium virens, 035 (ATCC 20904); and

Gliocladium virens, 041 (ATCC 20906).

4,996,158

OPTICAL RESOLUTION OF RACEMIC ALCOHOLS

Junichi Oda, 18, Shichiku Ushiwaka-cho, Kita-ku, Kyoto; Masaki Amano, 7-22, Higashiyama 2-chome, Chiba-ken, Kashiwa-shi; Haruhiko Toda, 15-1-118, Masago 2-chome, Chiba-ken, Chiba-shi, and Toshiyuki Koyagi, 241, Kamihirama, Nakahara-ku, Kanagawa-ken, Kawasaki-shi, all of Japan

Filed Dec. 21, 1988, Ser. No. 287,043
Claims priority, application Japan, Dec. 26, 1987, 62-330678; Mar. 16, 1988, 63-60568
Int. Cl.[5] C12P *7/02, 7/62*
U.S. Cl. 435—280 7 Claims

1. A method for resolving a racemic secondary alcohol into its two antipodes, comprising the steps of:

reacting a racemic secondary alcohol selected from the group consisting of 2-heptanol, 2-octanol, 2-nonanol, 2-decanol, (R,S)-3-chloro-1-p-toluenesulfonyloxy-2-propanol, (R,S)-1-phenylethanol, (R,S)-1-phenyl-2-chloroethanol, (R,S)-mandelonitrile and phenylethylene glycol with an esterifying agent selected from the group consisting of an acid anhydride and an enol ester of a carboxylic acid in an organic solvent in the presence of a hydrolase to esterify one of the antipodes of the racemic secondary alcohol with the esterifying agent, so that a reaction mixture containing the esterified antipode and unreacted antipode is formed; and

separating either the esterified antipode or unreacted antipode from said reaction mixture.

4,996,159

NEOVASCULARIZATION INHIBITORS AND METHODS FOR THEIR PRODUCTION AND USE

Bert M. Glaser, Owings M[i]lls, Md., assignor to The Johns Hopkins University, Baltimore, Md.

Continuation of Ser. No. 706,259, Feb. 26, 1985, abandoned.
Jan. 26, 1990, Ser. No. 471,024
Int. Cl.[5] C12P *21/00;* C07K *3/00, 15/06;* A61K *37/02*
U.S. Cl. 435—70.3 13 Claims

1. A process for producing a neovascularization inhibitor comprising the steps of:

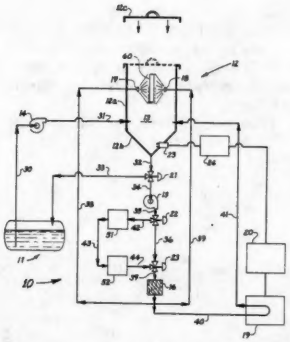
culturing retinal pigment epithelial cells to produce a culture medium containing said neovascularization inhibitor; and purifying said neovascularization inhibitor from said medium wherein said neovascularization inhibitor has a molecular weight of approximately 57,000±3,000 and an isoelectric point of approximately 4.6±0.3 and is stable in an environment with a pH of approximately from 2 to 3.

4,996,160

METHOD AND APPARATUS FOR QUANTITATIVE MEASUREMENT OF IONIC AND ORGANIC CONTAMINANTS REMAINING ON CLEANED SURFACES

Andrea J. Hausman Hazlitt, and Warren F. Richey, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jun. 9, 1987, Ser. No. 60,136
Int. Cl.[5] G01N *21/27, 21/51, 31/00*
U.S. Cl. 436—2 **37 Claims**



1. A method for determining ionic contamination and organic contamination on an electronic circuit assembly (ECA) comprising:

(a) contacting a previously defluxed ECA with a solvent adapted for removing ionic contaminant species and organic contaminant species on the surface of the ECA,

(b) substantially simultaneously measuring

(i) the spectral absorbance, in the ultraviolet or the visible wavelength range of about 190 nm to about 800 nm, of the organic contaminant species in the solvent contacted with the ECA and

(ii) the conductivity or resistivity of the ionic contaminant species in the solvent contacted with the ECA, and

(c) comparing the resultant absorbance measurement to a standard prepared for such comparison and comparing the conductivity measurements to a standard prepared for such comparison.

17. An apparatus for determining the ionic contamination and organic contamination of an electronic circuit assembly (ECA) comprising, in operable combination:

(a) a means for contacting a previously defluxed ECA with a solvent adapted for removing organic contaminant species on the surface of the ECA,

(b) a means for measuring the spectral absorbance, in the ultraviolet or the visible wavelength range of about 190 nm to about 800 nm, of the organic contaminant species in the solvent contacted with the ECA and substantially simultaneously measuring the conductivity of the ionic contaminant species in the solvent, and

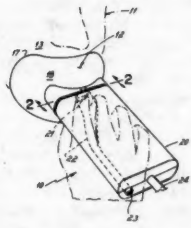
(c) a means for comparing the resultant absorbance units to a standard prepared for such purpose and the conductivity measurements to a standard prepared for such purpose.

4,996,161

BREATH ALCOHOL TESTING SYSTEM

Patrick J. Conners, Montgomery; Lawrence R. Stevens, Mason; Don R. Gaiser, Dayton, and Frank C. Pennypacker, Loveland, all of Ohio, assignors to Guardian Technologies, Inc., Denver, Colo.

Filed Oct. 16, 1987, Ser. No. 109,815
Int. Cl.[5] G01N *33/98*
U.S. Cl. 436—132 **27 Claims**



1. A breath alcohol testing system particularly suitable for unsupervised breath alcohol testing of a subject comprising:

a face mask having an internal surface, an external surface and an edge therebetween, said internal surface further defining a breath tube to convey a breath sample to means for testing said sample, said edge shaped for at least partially enclosing a portion of the face of a subject during delivery of said breath sample into said breath tube;

means responsive to the performance of an identity confirming act performed by said subject to verify the identity of said subject, said performance responsive means at least partially disposed within said face mask; and

means partially disposed in said face mask for insuring that the same subject performs both said confirming act and said delivery of said breath sample wherein said insuring means monitors the location of the face with respect to the mask.

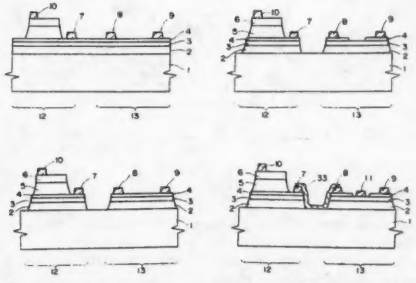
4,996,162
Patent Not Issued For This Number

4,996,163

METHOD FOR PRODUCING AN OPTO-ELECTRONIC INTEGRATED CIRCUIT

Goro Sasaki, Yokohama, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Feb. 22, 1989, Ser. No. 313,507
Claims priority, application Japan, Feb. 29, 1988, 63-46901; Feb. 29, 1988, 63-46902
Int. Cl.[5] H01L *31/18*
U.S. Cl. 437—5 **4 Claims**



1. A method for producing an opto-electric integrated circuit having a field effect transistor as an electronic device and

a photo-diode as an optical device both formed on an InP substrate, comprising:

a first step of forming a first epitaxial layer of GaInAs, a second epitaxial layer of n-AlInAs, a third epitaxial layer of n-InP, a fourth epitaxial layer of undoped GaInAs and a fifth epitaxial layer of p-GaInAs formed on an InP substrate in the stated order;

a second step of partially removing the fifth and the fourth epitaxial layers, leaving a p-electrode region in a photo-diode region so as to expose the third epitaxial layer;

a third step of forming an anode of said photo-diode on the fifth epitaxial layer and a cathode thereof on the third epitaxial layer in the photo-diode region, and forming a source electrode and a drain electrode of the field effect transistor on the the third epitaxial layer in a field effect transistor region;

a fourth step of removing the third, the second and the first epitaxial layers between the photo-diode and the field effect transistor, so as to electrically separate both regions;

a fifth step of etching the third epitaxial layer between the source electrode and the drain electrode in the field effect transistor region to expose the second epitaxial layer so as to form a gate electrode on the exposed second epitaxial layer; and

a sixth step of forming a wiring for electrically connecting the thus formed photo-diode and field effect transistor.

4,996,164

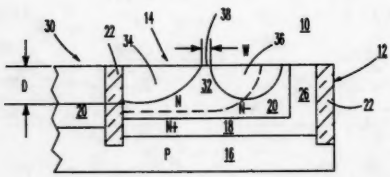
METHOD FOR FORMING LATERAL PNP TRANSISTOR

Peter A. Habitz, Wappingers Falls; Chang-Ming Hsieh, Fishkill, and Yi-Shiou Huang, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 2, 1989, Ser. No. 317,877

Int. Cl.[5] H01L *21/22*

U.S. Cl. 437—31 **13 Claims**



1. A process of forming a lateral PNP transistor, said process comprising the steps of:

providing a body of semiconductor material including an isolated N- device region;

implanting N dopant material at a first power and first dosage into a selected implant region of said device region;

implanting N dopant material at a second power and second dosage into said implant region;

forming a P type emitter region at least partially within said implant region; and

forming a P type collector region at least partially within said implant region such that an intrinsic base region is defined within said implant region proximate the surface of said body of semiconductor material.

4,996,165

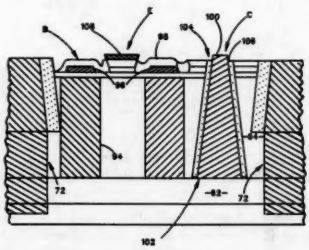
SELF-ALIGNED DIELECTRIC ASSISTED PLANARIZATION PROCESS

Mau-Chung F. Chang, and Peter M. Asbeck, both of Thousand Oaks, Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Apr. 21, 1989, Ser. No. 341,464

Int. Cl.[5] H01L *21/331, 21/31*

U.S. Cl. 437—31 **11 Claims**



7. A method of manufacturing a heterojunction bipolar transistor, comprising the steps of:

providing a heterojunction bipolar semiconductor wafer having a first layer of a first conductivity type, a second layer of a semiconductor of second conductivity type on the first layer, a third layer of a semiconductor of an opposite conductivity type to the second layer being positioned on the second layer forming a p-n junction, and a fourth layer of a semiconductor of the second conductivity type on the third layer forming a second p-n junction, at least one of the p-n junctions being a heterojunction;

forming a photoresist pattern on the wafer with an opening which defines a transistor location;

etching the third and fourth layers through an opening in the photoresist pattern down to the second layer and a portion of the second layer toward the first layer;

depositing a dielectric material on the second layer through the opening;

removing remaining photoresist material and dielectric material deposited thereon from the wafer;

depositing a thin layer of polymer on said wafer and into gaps between said dielectric and said second, third, and fourth layers;

forming a photoresist pattern on the wafer with a second opening which defines a base location for the heterojunction bipolar transistor;

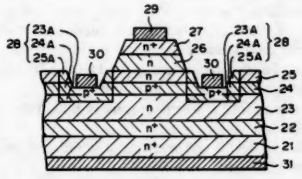
etching the fourth layer through the second opening to the third layer;
depositing base contact metal on the third layer through the opening;
depositing a second dielectric on the base contact metal and on the sidewalls of the second opening;
lifting off the photoresist with overlying second dielectric and metal while maintaining dielectric on the sidewalls;
defining a location for emitter contact metal on the fourth layer;
depositing emitter contact metal on the emitter contact location;
providing a passage through said fourth, third and second layers to the first layer; and
depositing collector contact metal on the first layer through the passage.

4,996,166

PROCESS FOR FABRICATING A HETEROJUNCTION BIPOLAR TRANSISTOR

Toshio Ohshima, Atsugi, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Division of Ser. No. 262,241, Oct. 20, 1988, Pat. No. 4,294,283, which is a continuation of Ser. No. 832,896, Feb. 26, 1986, abandoned. This application Jan. 17, 1990, Ser. No. 466,646
Claims priority, application Japan, Feb. 28, 1985, 60-039120
Int. Cl.[5] H01L *21/331*
U.S. Cl. 437—31 **2 Claims**



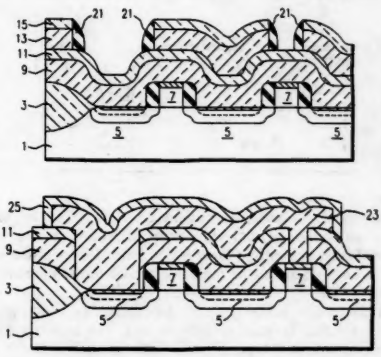
1. A process for fabricating a bipolar transistor comprising the steps of:
(a) forming a first semiconductor layer of a first conductivity type;
(b) forming a second semiconductor layer of a second conductivity type, opposite to the first conductivity type, on the first semiconductor layer;
(c) forming a third semiconductor layer of the first conductivity type on the second semiconductor layer, the third semiconductor layer comprising a semiconductor forming a heterojunction with the second semiconductor layer and having a bandgap wider than that of the second semiconductor layer;
(d) selectively removing a portion of the third semiconductor layer so that a portion of the second semiconductor layer is exposed and out overlaid by the third semiconductor layer;
(e) doping an impurity into a region of the third semiconductor layer extending along an entire boundary between the third semiconductor layer and the exposed portion of the second semiconductor layer to convert the conductivity type of that region into the second conductivity;
(f) forming a first electrode electrically connected with the first semiconductor layer;
(g) forming a second electrode above and in contact with the second semiconductor layer in the exposed region; and
(h) forming a third electrode above the third semiconductor layer.

4,996,167

METHOD OF MAKING ELECTRICAL CONTACTS TO GATE STRUCTURES IN INTEGRATED CIRCUITS

Min-Liang Chen, Allentown, Pa., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 29, 1990, Ser. No. 546,131
Int. Cl.[5] H01L *21/70*
U.S. Cl. 437—40 **9 Claims**



1. A method of integrated circuit manufacture comprising the steps of making a plurality of field-effect transistors, each comprising source and drain regions and a gate structure, and being disposed on a common substrate and making an electrical contact to at least said gate structure of at least one of said field effect transistors, said step of making an electrical contact comprising the further steps of forming first, second, third, and fourth insulating layers having first, second, third, and fourth compositions, respectively, over said plurality of said field-effect transistors, adjacent layers having different etching characteristics;
patterning a resist over said fourth layer to expose selected portions of said fourth layer, at least one of said portions being generally over at least said gate structure of a first transistor;
etching said exposed portions of said fourth and third layers to form windows which expose portions of said second layer;
forming sidewalls on said windows;
etching said exposed portions of said second and first layers using said sidewalls and said second layer, respectively, as etch masks to expose at least said gate structure; and,
forming a patterned conductor region contacting at least gate structure of said first transistor.

4,996,168

METHOD FOR MANUFACTURING P TYPE SEMICONDUCTOR DEVICE EMPLOYING DIFFUSION OF BORON GLASS

Hiroji Ozaki, and Shigeo Nagao, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

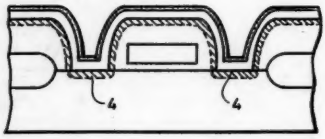
Filed Nov. 1, 1988, Ser. No. 265,448
Claims priority, application Japan, Nov. 7, 1987, 62-281729
Int. Cl.[5] H01L *21/223, 21/225, 21/383, 21/385*
U.S. Cl. 437—164 **11 Claims**

1. A method for manufacturing a P-type semiconductor device, comprising
preparing a semiconductor substrate having a main surface and a region having a predetermined N-type impurity concentration;
forming a conductor layer having an upper portion and opposite end portions on the main surface of the semiconductor substrate, and an insulating film on portions spaced

at predetermined intervals apart from the opposite portions of a predetermined width of the main surface of the semiconductor substrate;

forming a diffusion preventing layer on the upper and opposite end portions of the conductor layer and on the spaced apart portions of the insulating layer, and on portions spaced at predetermined intervals apart from the opposite end portions of the conductor layer of the main surface contiguous to the conductor layer and the insulating layer;

forming a first layer comprising polysilicon or silicon oxide



on the diffusion preventing layer and on the region of the main surface of said semiconductor substrate where the diffusion preventing layer is not formed for a boron glass to be formed on the main surface of the semiconductor substrate;

forming a first boron glass by depositing first boron nitride on the first layer of polysilicon or silicon oxide; and

forming a first P-type diffusion layer by diffusing the first boron glass to thereby form a shallow P-type diffusion layer in the substrate on the region where the diffusion preventing layer does not exist.

4,996,169

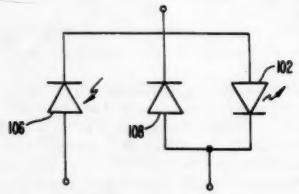
SEMICONDUCTOR LASER ASSEMBLY

Wai-Hon Lee, Cupertino, Calif., assignor to Pencom International Corp., Sunnyvale, Calif.

Division of Ser. No. 313,691, Feb. 21, 1990. This application May 18, 1990, Ser. No. 525,525

Int. Cl.[5] H01L *25/16*

U.S. Cl. 437—209 **10 Claims**



1. A method of forming a semiconductor laser assembly, comprising the steps of:

forming a heatsink having first and second orthogonal surfaces;

mounting a first semiconductor photodetector on said first surface of said heatsink;

mounting first and second conductive blocks on said first surface of said heatsink, said conductive blocks being electrically isolated from each other and said first photodetector, each of said conductive blocks having first and second surfaces parallel to said first and second surfaces of said heatsink, respectively, each of said first and second surfaces of said first and second conductive blocks being of sufficient size to act as a wire bonding pad;

mounting a semiconductor chip on said second surface of said heatsink, including a second semiconductor photodetector and a conductive region having first and second surfaces parallel to said first and second surfaces of said heatsink, respectively, said first surface of said conductive region being of sufficient size to act as a wire bonding pad; and

mounting a semiconductor laser to said second surface of said conductive region.

4,996,170

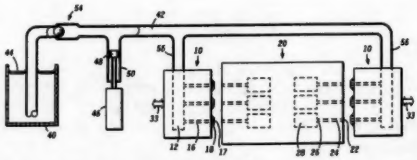
MOLDING PROCESS FOR ENCAPSULATING SEMICONDUCTOR DEVICES USING A THIXOTROPIC COMPOUND

John Baird, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 30, 1990, Ser. No. 559,922

Int. Cl.[5] H01L *21/56, 23/28*

U.S. Cl. 437—219 **7 Claims**



1. A molding process for encapsulating semiconductor devices, comprising the steps of:

providing a manifold in which a thixotropic compound is disposed, the manifold having at least one feed runner for expelling the thixotropic compound therethrough wherein the feed runner is closed;

providing a mold having at least one mold cavity, and having a subrunner extend from each mold cavity to the exterior of the mold placing a semiconductor device in each mold cavity and closing the mold;

transferring the thixotropic compound from a feed pot to the manifold, and into each feed runner;

holding the manifold at a temperature in which the thixotropic compound is not cured;

holding the mold at a temperature at which the thixotropic compound is cured;

engaging the manifold with the mold, such that each feed runner communicates with each subrunner;

opening each feed runner of the manifold;

transferring the thixotropic compound from the manifold to the mold through each feed runner of the manifold to each subrunner of the mold and into the mold cavity; and

separating the manifold and the mold, drawing the thixotropic compound near the exit of each feed runner into the manifold, thus making a clean separation.

4,996,171

SILVER-FILLED GLASS

Nigel M. Davey, Wargrave, and Gordon G. Ferrier, Reading, both of United Kingdom, assignors to Johnson Matthey Public Limited Company, London, England

Filed Dec. 22, 1988, Ser. No. 288,640

Claims priority, application United Kingdom, Dec. 24, 1987, 8730196

Int. Cl.[5] C03C *8/18*

U.S. Cl. 501—19 **5 Claims**

1. In a silver-filled glass bonding paste for the electronics industry, the improvement wherein a lead phosphate glass consisting essentially of lead oxide, phosphorus oxide and at least one further oxide selected from the oxides of magnesium, calcium, strontium, barium, cadmium, boron, silicon and vanadium and wherein said lead phosphate glass has a softening temperature in the range of 150°–400 ° C. is the glass component of the paste.

4,996,172

RARE EARTH-CONTAINING ZINC PHOSPHATE GLASSES

George H. Beall, Big Flats; James E. Dickinson, Jr., and Candace J. Quinn, both of Corning, all of N.Y., assignors to Corning Incorporated, Corning, N.Y.

Filed Jun. 29, 1989, Ser. No. 372,764
Int. Cl.[5] C03C *3/16, 3/17*
U.S. Cl. 501—45 4 Claims

1. A glass exhibiting a transition temperature below 350° C., a working temperature below 450° C., and exceptional resistance to attack by mild aqueous alkaline solutions consisting essentially, expressed in terms of mole percent on the oxide basis, of:

LiO_2O	0–25	P_2O_5	28–45
Na_2O	0–25	Al_2O_3	0–4
K_2O	0–25	SnO	0–35
$Li_2O + Na_2O + K_2O$	10–35	PbO	0–35
ZnO	30–55	SnO + PbO	0–35

Y_2O_3 and/or at least one rare earth metal oxide (RE_2O_x) 0.5–5 wherein at least two alkali metal oxides are present.

4,996,173

OPTICAL GLASS

Kazuo Tachiwana, Akishima, Japan, assignor to Hoya Corporation, Tokyo, Japan

Filed Feb. 13, 1989, Ser. No. 309,360
Claims priority, application Japan, Feb. 29, 1988, 63-47117
Int. Cl.[5] C03C *3/062, 4/00*
U.S. Cl. 501—73 3 Claims

1. An optical glass having a refractive index nd of at least 1.70 and an Abbe's number vd of at most 30 consisting essentially, in percent by weight based upon the total composition, of:

SiO_2	5–30%
GeO_2	0–25%
the sum of SiO_2 and GeO_2	5–30%
Na_2O	0–19%
K_2O	0–19%
the sum of Na_2O and K_2O	10–19%
P_2O_5	10–35%
Nb_2O_5	18–49%
TiO_2	0–14%
Ta_2O_5	0–20%
ZrO_2	0–10%
WO_3	0–5%
PbO	0–20%
ZnO	0–10%
Bi_2O_3	0–20%
the sum of Nb_2O_5, Ta_2O_5, ZrO_2, WO_3, PbO, ZnO and Bi_2O_3	18–49%
B_2O_3	0–15%
Al_2O_3	0–5%
and further comprising	
As_2O_3	0.3% by weight based on the total amount of the above components.

4,996,174

PRODUCTION OF CERAMIC MATERIALS

James D. Birchall, Mouldsworth, Nr. Chester; Mary J. Mockford, Upton, and David R. Stanley, Knutsford, all of England, assignors to Imperial Chemical Industries Plc, London, England

Filed Mar. 18, 1987, Ser. No. 27,270
Claims priority, application United Kingdom, Mar. 27, 1986, 8607687; May 20, 1986, 8612285
Int. Cl.[5] C04B *35/56, 35/58*
U.S. Cl. 501—87 23 Claims

1. A process for the production of a ceramic material which process comprises reacting a first reactant which comprises at least one compound of a metallic or non-metallic element having two or more groups reactive with hydroxyl groups with a second reactant which comprises at least one organic compound having two or more hydroxyl groups to produce an oxygen containing polymeric product, heating the oxygen-containing polymeric product in an inert atmosphere to produce a coked product containing carbon and an oxide of the metallic or non-metallic element, and heating the coked product to effect a carbothermic reaction between the oxide of the metallic or non-metallic element and the carbon to produce a ceramic, in which the proportion of the first and second reactants is chosen such that in the coked product the proportion by weight of carbon to the oxide of the metallic or non-metallic element is in the range from 50 to 150% of the proportion which is theoretically required to produce the ceramic material.

4,996,175

REFRACTORY COMPOSITION AND METHOD FOR METAL CASTING

David H. Sturgis, Gladstone, Oreg., assignor to Precision Castparts Corp., Portland, Oreg.

Filed Jan. 25, 1988, Ser. No. 148,010
Int. Cl.[5] C04B *35/50*
U.S. Cl. 501—126 19 Claims

1. A method for producing a casting flour usable in a reactive metal casting slurry, the method comprising:

forming a mixture which consists essentially of Y_2O_3 casting refractory powder as the predominant ingredient, V_2O_5 in an amount sufficient that said mixture has a lower sintering temperature than said powder, and a fugitive binder in an amount sufficient to maintain the mixture in a homogeneous state;

applying heat to said mixture in an amount sufficient to sinter said mixture; and

grinding the sintered mixture to form a casting flour.

4,996,176

RESERVOIR FEED METHOD OF MAKING CERAMIC COMPOSITE STRUCTURES AND STRUCTURES MADE THEREBY

Marc S. Newkirk, Newark; H. Daniel Lesher; Ratnesh K. Dwivedi, both of Wilmington, and Robert C. Kantner, Newark, all of Del., assignors to Lanxide Technology Company, LP, Newark, Del.

Division of Ser. No. 908,067, Sep. 16, 1986, Pat. No. 4,900,699.
This application Sep. 28, 1989, Ser. No. 414,195
Int. Cl.[5] C04B *35/10, 35/18*
U.S. Cl. 501—127 20 Claims

1. A self-supporting ceramic-surfaced metal structure comprising (a) a substrate comprising a parent metal and a ceramic surface formed integrally with said substrate and comprising a filler embedded by an oxidation reaction product of said parent metal with an oxidant.

4,996,177

SINTERED ALUMINA ARTICLE WITH HIGH FLEXURAL STRENGTH AND PROCESS FOR PRODUCING SAME

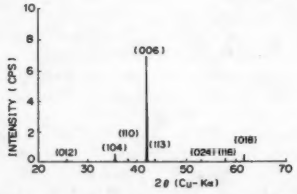
Shigehide Takagi, Narashino; Hideo Yano, Tokorozawa; Takashi Oku, Funabashi; Keijiro Shigeru, Funabashi; Yoshifumi Kuboto, Funabashi, and Tsutomu Shishikura, Chiba, all of Japan, assignors to Sumitomo Cement Co., Ltd., Tokyo, Japan

Filed Jul. 22, 1988, Ser. No. 222,976

Claims priority, application Japan, Jul. 27, 1987, 62-185539

Int. Cl.[5] C04B *35/10*

U.S. Cl. 501—153 5 Claims



1. A sintered alumina article consisting essentially of sintered plate crystalline corundum particles which are a product of hydrothermal treatment of gibbsite ($Al(OH)_3$) particles having a size of 10 μm or less, at a temperature of 350° C. to 800° C. under a pressure of 100 atmospheres or less, wherein said plate crystalline particles have two parallel cleavage surface planes, and wherein said plate crystalline particles have been accumulated on and bonded to each other such that the cleavage surface planes of the accumulated plate crystalline particles are substantially parallel to each other and wherein said crystalline particles have a major dimension of the cleavage surface planes thereof of from 0.05 to 10 μm and a thickness thereof of 0.01 to 1 μm; said sintered alumina article having a flexural strength of at least 5800 kg/cm^2.

4,996,178

LOW TEMPERATURE SYNTHESIS OF CONDENSATION POLYMERS

Naoya Ogata, Tokyo, Japan, assignor to The Goodyear Tire & Rubber Co., Akron, Ohio

Division of Ser. No. 344,160, Apr. 27, 1989, Pat. No. 4,923,839, which is a division of Ser. No. 180,924, Apr. 11, 1988, Pat. No. 4,843,053, which is a division of Ser. No. 11,464, Feb. 5, 1987, Pat. No. 4,804,730. This application Jan. 8, 1990, Ser. No. 461,941

Int. Cl.[5] B01J *31/06*

U.S. Cl. 502—159 13 Claims

1. A catalyst system which is particularly useful in synthesizing condensation polymers which is comprised of (1) at least one polymeric agent having bound acid acceptor groups and (2) at least one triphenylphosphine dihalide.

4,996,179

MALEIC ANHYDRIDE CATALYSTS AND PROCESS FOR THEIR MANUFACTURE

Muin S. Haddad, Naperville; Bernard L. Meyers, Wheaton, and William S. Eryman, Naperville, all of Ill., assignors to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 297,329, Jan. 17, 1989, Pat. No. 4,933,312. This application Feb. 22, 1990, Ser. No. 484,342

The portion of the term of this patent subsequent to Jun. 12, 2007, has been disclaimed.

Int. Cl.[5] B01J *27/198*

U.S. Cl. 502—209 41 Claims

1. A catalyst for the production of maleic anhydride by the oxidation of a feedstock comprising a member selected from the group consisting of benzene, n-butane, butenes, butadiene and mixtures thereof, which catalyst comprises a phosphorus-vanadium mixed oxide and exists in the form of geometric shapes, said catalyst in the form of said geometric shapes having been heated in an inert atmosphere at a temperature within the range of about 343° C. (650° F.) to about 704° C. (1,300° F.) prior to being exposed to an oxygen-containing atmosphere at an elevated temperature wherein said phosphorus-vanadium mixed oxide catalyst has an atomic ratio of vanadium-to-phosphorus in the range of about 0.5:1 to about 1.25:1.

4,996,180

CATALYST OF COPPER OXIDE AND CERIA

Alan F. Diwell; Christopher Hallett, both of Reading; Graham Pansell, Wokingham, and John W. Hayes, Reading, all of United Kingdom, assignors to Johnson Matthey Public Limited Company, United Kingdom

Filed Dec. 8, 1988, Ser. No. 281,406

Claims priority, application United Kingdom, Dec. 11, 1987, 8728996

Int. Cl.[5] B01J *23/10, 23/72*

U.S. Cl. 502—304 12 Claims

1. A catalyst for use in a method of treating gaseous effluents in order to combat air pollution by contacting the gaseous effluents with the catalyst, in which the catalyst consists essentially of an intimate mixture of copper oxide and ceria, the weight of the copper oxide being less than the weight of the ceria.

4,996,181

AGGLOMERATE ABSORBENTS COMPRISING COPPER AND ZINC USEFUL FOR SULPHUR COMPOUNDS REMOVAL

Patrick J. Denny, Darlington, and Peter Wood, Stockton-On-Tees, both of England, assignors to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 39,070, Apr. 16, 1987, Pat. No. 4,871,710. This application Aug. 24, 1989, Ser. No. 398,275

Claims priority, application United Kingdom, Apr. 25, 1986, 8610196

The portion of the term of this patent subsequent to Oct. 3, 2006, has been disclaimed.

Int. Cl.[5] B01J *21/08, 20/06, 27/232;* B01D *53/02*

U.S. Cl. 502—414 4 Claims

1. Agglomerates capable of absorbing carbonyl sulphide, mercaptans, and hydrogen sulphide, and comprising particles of metal compounds bound together by a binder, whereby said agglomerates have

a size in the range of 1 to 10 mm;

a BET surface area of at least 80 $m^2 \cdot g^{-1}$;

a calcined density of not more than 1.5 $g \cdot cm^{-3}$, as determined by measuring the density of a sample of said agglomerates after calcination for 4 hours at 350° C.; and

a porosity of not less than 0.6;

said agglomerates comprising an intimate mixture of

(a) at least one copper compound and at least one zinc compound; and

(b) at least one element X compounds, wherein element X is selected from aluminum, silicon, and metals of Groups IIIA, IVA, VA, VIA, and VIIIA of the Periodic Table,

and wherein said copper, zinc, and element X compounds are in the form of oxides, hydroxides, carbonates and/or basic carbonates; and

said copper, zinc and element X compounds are in such proportions that

(i) said copper atoms form greater than 30%, the zinc atoms form at least 5%, and the element X atoms form 5–20% of the total number of copper, zinc and element X atoms in said agglomerates; and

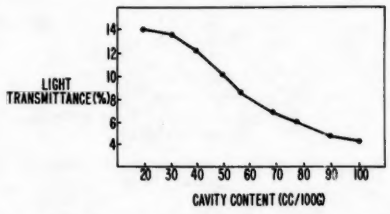
(ii) after ignition of said agglomerates at 900° C. thereby forming an ignited composition consisting of the constituents of said agglomerates in oxide form, the cupric oxide plus zinc oxide content of the ignited composition is at least 80% by weight.

4,996,182

HEAT-SENSITIVE RECORDING MATERIAL

Takeshi Matsui; Takehiko Watanabe, both of Osaka; Katsunori Miyazaki, Inuyamaa, and Hiroo Hayashi, Takatsuki, all of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Feb. 21, 1989, Ser. No. 312,916
Claims priority, application Japan, Jun. 8, 1988, 63-140911
Int. Cl.[5] B41M 5/18
U.S. Cl. 503—200 5 Claims



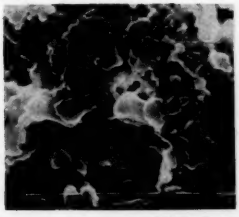
1. A heat-sensitive recording material which comprises a substrate and a heat-sensitive recording layer formed thereon, said substrate having as a constituent element a synthetic resin film layer containing minute cavities, said synthetic resin film layer being biaxially oriented and comprising a mixture of a polyolefin or a polyester and a particulate substance immiscible with the polyolefin or polyester, wherein a content of cavities in said synthetic resin film layer is 40 to 100 cc/g.

4,996,183

THERMOSENSITIVE RECORDING MATERIALS

Masaaki Otani; Shigetoshi Hiraishi, and Kenji Hyodo, all of Tokyo, Japan, assignors to Mitsubishi Paper Mills, Limited, Tokyo, Japan

Filed Mar. 28, 1989, Ser. No. 329,766
Claims priority, application Japan, May 27, 1988, 63-131273
Int. Cl.[5] B41M 5/18
U.S. Cl. 503—208 6 Claims



X10,000

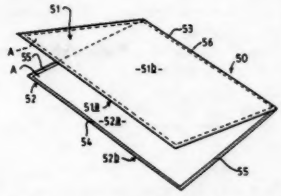
1. A thermosensitive recording material comprising a support having provided thereon a thermosensitive color forming layer comprising a dye cursor, a color developer for said dye precursor, a sensitizer, a dispersing agent and a binder, a softening point of a mixture of said dispersing agent and said binder being at least 70° C.; said dispersing agent being present in an amount of 1 to 7% by weight based on total weight of said dye precursor, color developer and sensitizer and said binder being present in an amount of 7 to 20% by weight based on total weight of said dye precursor, color developer and sensitizer, and said binder being present in an amount of 7 to 20% by weight based on total weight of said dye precursor, color developer and sensitizer, respectively.

4,996,184

SHEET MATERIAL FOR USE IN A METHOD FOR NON-IMPACT PRINTING, PHOTOCOPYING AND LIKE REPROGRAPHIC PROCESSES

Leonard N. Bevan, Warwickshire; Colin R. Moore, Worcestershire, and Victor G. Atkinson, Birmingham, all of United Kingdom, assignors to Carrs Paper Limited, Solihull, United Kingdom

Filed Mar. 30, 1989, Ser. No. 330,692
Claims priority, application United Kingdom, Mar. 30, 1988, 8807598
Int. Cl.[5] B41M 5/22
U.S. Cl. 503—226 4 Claims



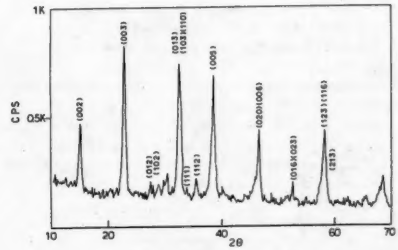
1. A stack of sheets of material wherein each sheet has one face thereof provided with a CB coating for a carbonless copy system and another face thereof free of said CB coating, and the sheets are arranged in pairs with said CB coatings thereof arranged in face-to-face relation, the two sheets of each pair being connected together at least at one edge thereof and the neighboring sheets of superposed pairs in the stack being unconnected with one another.

4,996,185

CERAMIC SUPERCONDUCTING THIN FILM

Naoji Fujimori; Keizo Harada; Shuji Yazu, and Tetsuji Jodai, all of Hyogo, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed May 31, 1988, Ser. No. 200,206
Claims priority, application Japan, May 31, 1987, 62-136939; May 31, 1987, 62-136940; Jun. 4, 1987, 62-140611; Jun. 4, 1987, 62-140613
Int. Cl.[5] B05D 5/12, 5/06
U.S. Cl. 505—1 13 Claims



1. A superconducting thin film comprising a compound oxide represented by the general formula

$$Ln_1Ba_2Cu_3O_{7-\delta}$$

in which Ln is an element selected from a group consisting of Y, La, Gd, Ho, Er, Tm, Yb, Nd, Sm, Eu and Lu, and δ is a number between zero and one, wherein said thin film is deposited on a single crystal substrate and the X-ray diffraction chart of said thin film possesses at least one crystal face of (00n) plane having an intensity J_{00n} in an X-ray diffraction pattern which satisfies the following relation:

$J_{00n}/J_{MAX} \geqq 2(I_{00n}/I_{MAX})$

in which

(00n) is an index of a crystal face of said thin film, wherein "n" is an integer;

I_{MAX} is an intensity of the most intense peak in a powder X-ray diffraction chart measured in a powder sample of a compound oxide represented by a formula $Y_1Ba_2Cu_3O_7$ used as a reference;

I_{00n} is an intensity of the (00n) plane in said powder X-ray diffraction chart;

J_{MAX} is an intensity of a crystal face having the most intense peak in said powder X-ray diffraction chart and is observed in an X-ray diffraction chart measured in said thin film; and

J_{00n} is an intensity of the (00n) plane in said X-ray diffraction chart measured in said thin film.

4,996,186

FLUX METHOD FOR PRODUCING CRYSTALS OF SUPERCONDUCTING $YBA_2CU_3O_7$

Zhao Z. Wang, Princeton, and Nai-Phuan Ong, Belle Mead, both of N.J., assignors to Princeton University, Princeton, N.J.

Filed Aug. 5, 1988, Ser. No. 228,979

Int. Cl.[5] H01L *39/12*; C30B *9/06*; C01F *17/00*

U.S. Cl. 505—1 **8 Claims**

1. A method for producing single crystals of $YBa_2Cu_3O_7$ which undergo a transition to the superconducting state above 90K, comprising:

(a) preparing a flux composition by mixing BaO_2 and CuO powders in the molecular weight ratio of approximately 1:1, layering on top of the mixture powdered $YBa_2Cu_3O_7$ in an amount up to approximately 20% of the total weight of the BaO_2-CuO mixture, firing the mixture in air at approximately 930° C.–950° C. for approximately 15 hours or longer to thereby form $BaCuO_{2+x}$ where $x=0.10$ to 0.20, and thereafter raising the temperature from 930° C.–950° C. to 980° C.–1040° C. within ½ hour to melt the $BaCuO_{2+x}$ to form a flux;

(b) maintaining the temperature of the flux of step (a) at 980° C.–1040° C. for an amount of time sufficient to dissolve the $YBa_2Cu_3O_7$ into the molten $BaCuO_{2+x}$;

(c) cooling thereafter the flux to approximately 1020° C.–980° C.:

(d) providing an oxygen gas flow to the flux when the temperature is approximately 1020° C.–980° C.;

(e) maintaining the flux in an oxygen gas flow at approximately 980° C. for approximately at least 30 minutes; and

(f) cooling thereafter the flux slowly to room temperature in continuing oxygen gas flow.

4,996,187

EPITAXIAL BA-Y-CU-O SUPERCONDUCTOR FILM

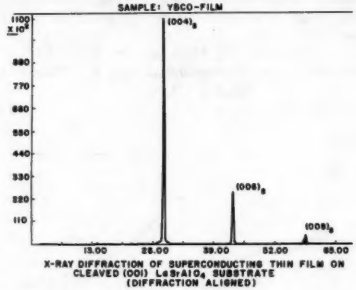
Bruce H. T. Chai, Bridgewater, N.J., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Oct. 17, 1988, Ser. No. 258,916

Int. Cl.[5] H01L *39/12*

U.S. Cl. 505—1 **10 Claims**

1. A superconducting structure comprising, in combination, a crystal substrate having a superconducting film epitaxially deposited thereon, wherein wherein the substrate is a crystal selected from the group consisting of $SrLaAlO_4$, $SrLaGaO_4$, $SrPrGaO_4$, $SrNdGaO_4$, $SrSmGaO_4$, $SrEuGaO_4$, $CaLaGaO_4$,



$CaPrGaO_4$ and $CaNdGaO_4$, and wherein the superconducting film is a Ba-Y-Cu-O type superconductor.

4,996,188

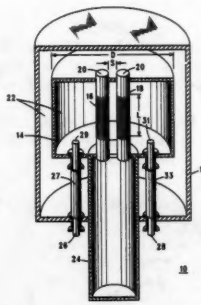
SUPERCONDUCTING MICROWAVE FILTER

Richard S. Kommrusch, Schaumburg, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 28, 1989, Ser. No. 387,548

Int. Cl.[5] H01B *12/00*; H01P *1/20*

U.S. Cl. 505—1 **7 Claims**



1. In a microwave cavity filter comprised of an evacuated substantially cylindrical housing with an RF input terminal and an RF output terminal, the cavity filter preferentially coupling RF energy at at least one preferred frequency to the RF output terminal, an improvement comprising:

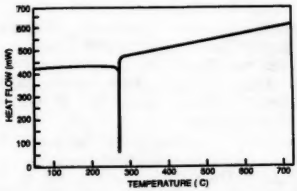
at least one dielectric cylinder mounter within said evacuated substantially cylindrical housing, said dielectric cylinder having a superconducting material coating at least a portion of the exterior of said dielectric cylinder, coolant for said superconducting material being transported through only the interior of said cylinder, said dielectric cylinder and superconducting material thereon forming a superconducting resonator element within said substantially cylindrical housing coupling RF energy from the RF input terminal to the RF output terminal, said at least one superconducting resonating element establishing the resonant frequency of the filter, the filter frequency response, and RF power coupling between the RF input and the RF output terminals.

4,996,189

METHOD OF PRODUCING MIXED METAL OXIDE MATERIAL, AND OF PRODUCING A BODY COMPRISING THE MATERIAL

Kostantinos Kourtakis, Summit, and Murray Robbins, Berkeley Heights, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Oct. 24, 1988, Ser. No. 261,656
Int. Cl.[5] C01F *17/00*; H01L *39/12*
U.S. Cl. 505—1 9 Claims



1. A method of producing an article that comprises a body comprising a mixed metal oxide of nominal composition $M_xM'_y \ldots O_z$ wherein M, M' . . . are metal elements and at least each of x, y and z is greater than zero, the method comprising

(a) forming an intimate mixture comprising at least one salt each of M, M' . . . such that the mixture contains M, M' . . . in essentially the ratio x:y: . . . ; with the salts chosen such that at least one of the salts is an oxidizing agent with respect to at least one of the other salts (to be referred to as the reducing agent);

(b) heating the mixture at least to a reaction temperature less than about 300° C. such that an exothermic oxidation-reduction occurs and a precursor material of the mixed metal oxide is formed from the mixture, the precursor material consisting essentially of M, M' . . . and, optionally of oxygen;

(c) heating the precursor material in an oxygen-containing atmosphere such that the mixed metal oxide is formed from the precursor material; and

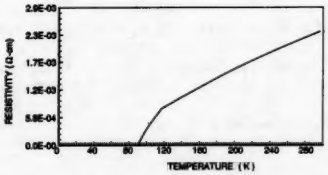
(d) carrying out one or more further steps towards completing the article.

4,996,190

SUPERCONDUCTING THIN FILM AND A PROCESS FOR DEPOSITING THE SAME

Kenjiro Higaki; Keizo Harada; Naoji Fujimori; Hideo Itozaki, and Shuji Yazu, all of Hyogo, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jun. 19, 1989, Ser. No. 367,732
Claims priority, application Japan, Jun. 17, 1988, 63-149414
Int. Cl.[5] B32B *9/00*
U.S. Cl. 505—1 3 Claims



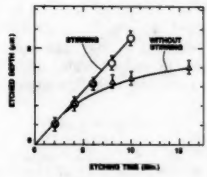
1. A superconductor comprising a substrate and a superconducting thin film of a superconducting compound oxide containing bismuth (Bi) deposited on the substrate, characterized in that said superconducting thin film is deposited on {110} plane of a single crystal of magnesium oxide (MgO).

4,996,191

METHOD FOR ETCHING SUPERCONDUCTOR MATERIALS

Takeshi Kobayashi, Osaka; Masayoshi Tonouchi, Toyonaka, and Yoshiyuki Sakaguchi, Osaka, all of Japan, assignors to Lion Corporation, Tokyo, Japan

Filed Dec. 15, 1988, Ser. No. 284,662
Claims priority, application Japan, Jun. 17, 1988, 63-149783
Int. Cl.[5] C09K *13/06*
U.S. Cl. 505—1 11 Claims



1. A method of chemically etching a barium-copper-oxygen or calcium-copper-oxygen high-temperature superconductor material, comprising:

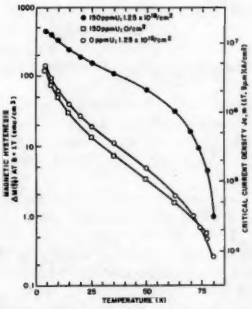
etching the superconductor material with an etchant comprising 1-hydroxy-ethane-1,1-diphosphonic acid.

4,996,192

Y-BA-CU-O SUPERCONDUCTOR CONTAINING RADIOACTIVE DOPANTS

Robert L. Fleischer, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jul. 17, 1989, Ser. No. 380,966
Int. Cl.[5] H01B *12/00*
U.S. Cl. 505—1 17 Claims



1. A process for producing a superconductive body which comprises providing a matrix-forming powder of oxides or precursor therefor wherein the oxide composition corresponds to the matrix composition comprised of $YBa_2Cu_3O_{7-y}$ where y ranges from zero to about 1, providing an oxide additive or precursor therefor selected from the group consisting of natural uranium dioxide, uranium-235 dioxide, plutonium -239 dioxide and mixtures thereof, all of the uranium component of said additive and all of the plutonium-239 component of said additive providing dopant atoms, said natural uranium dioxide providing dopant atoms comprised of natural uranium which includes the uranium-235 isotope, forming a mixture of said matrix-forming powder and said additive or precursor therefor, heating said mixture to a reaction temperature ranging from greater than about 800° C. to below the melting point of said oxides to produce a reaction product comprised of said matrix composition and said dopant atoms wherein said dopant atoms being substituted in said matrix composition in an

amount ranging to their solubility limit therein, said precursors decomposing below said reaction temperature producing said oxides, comminuting said reaction product to produce a sinterable powder, forming said sinterable powder into a compact, sintering said compact in an oxidizing atmosphere at a temperature ranging from about 900° C. to below the melting point of said sinterable powder producing a sintered polycrystalline body having an open porosity ranging from zero to about 20% by volume of said body, cooling said body in an oxidizing atmosphere at a rate which produces a superconductive body and irradiating said superconductive body with thermal neutrons causing a sufficient number of said uranium-235 and/or plutonium-239 dopant atoms to undergo fission to produce from about 2.5×10^{14} to about 50×10^{14} fission events per cubic centimeter of the resulting irradiated superconductive body, said uranium-235 and/or plutonium-239 dopant atoms being present in an amount sufficient to produce said fission events.

4,996,193

COMBINED TOPICAL AND SYSTEMIC METHOD OF ADMINISTRATION OF CYCLOSPORINE

Charles W. Hewitt, Orange, and Kirby S. Black, Santa Ana, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Mar. 3, 1989, Ser. No. 318,676

Int. Cl.[5] A61K *37/02*

U.S. Cl. 514—11 **22 Claims**

1. A method for treating T-cell mediated immune processes, allograft rejection, inflammations, autoimmune conditions or cyclosporin-responsive conditions in animals, comprising: topically applying a formulation containing cyclosporin in pharmaceutically effective amounts to the affected tissue; and systemically administering a formulation containing cyclosporin in pharmaceutically effective amounts in conjunction with said topical application.

4,996,194

PRESSURE TREATED AUTOIMMUNE SPECIFIC T CELL COMPOSITIONS

Irun R. Cohen, and Meir Shinitzky, both of Rehovot, Israel, assignors to Yeda Research and Development Co. Ltd., Rehovot, Israel

Continuation-in-part of Ser. No. 648,802, Sep. 7, 1984, Pat. No. 4,634,590. This application Sep. 23, 1986, Ser. No. 910,876

Claims priority, application Israel, Sep. 11, 1983, 69686

Int. Cl.[5] A61K *39/39, 41/00, 45/05*

U.S. Cl. 514—21 **34 Claims**

1. A preparation for preventing or treating an autoimmune disease, comprising T-lymphocyte cells which have developed specificity for the autoimmune disease specific antigen and which cells have been activated either by incubating in the presence of the autoimmune disease specific antigen or by incubating with a mitogen capable of inducing an immune response by the T-lymphocyte cells, following which said cells have been pressure treated by means of hydrostatic pressure of sufficient pressure and time to cause augmented antigenicity of the T-lymphocyte cells without substantial loss of membrane proteins from the cells.

4,996,195

DERIVATIVES OF α,D-GLUCOFURANOSE OR α,D-ALLOFURANOSE AND INTERMEDIATES FOR PREPARING THESE DERIVATIVES

Bruce Ronsen, River Forest; Sudershan K. Arora, Westchester, and Albert V. Thomas, Niles, all of Ill., assignors to Greenwich Pharmaceuticals Inc., Ft. Washington, Pa.

Filed Jan. 9, 1989, Ser. No. 294,838

Int. Cl.[5] A61K *31/70*

U.S. Cl. 514—23 **32 Claims**

1. A monosaccharide compound selected from the group consisting of:

1,2:3,5-Di-O-isopropylidene-6-deoxy-6-thio-3'(N',N'-dimethylamino-n-propyl)-α,D-glucofuranose;

1,2-O-isopropylidene-3-O-n-heptyl-α,D-glucofuranose;

1,2-O-isopropylidene-3-deoxy-3-amino-3'-(propan-1'-ol)-α,D-allofuranose; and

1,2:3,5-Di-O-isopropylidene-6-O-2'-(N'-ethylpyrrolidyl)-α,D-glucofuranose.

4,996,196

NOVEL DESICCANT AND DEHYDRATION THEREWITH

Masakazu Mitsuhashi; Shuzo Sakai, and Toshio Miyake, all of Okayama, Japan, assignors to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo, Okayama, Japan

Division of Ser. No. 870,132, Jun. 3, 1986, Pat. No. 4,870,059. This application Jul. 21, 1989, Ser. No. 382,945

Claims priority, application Japan, Nov. 27, 1985, 60-266559; Dec. 11, 1985, 60-278634

The portion of the term of this patent subsequent to Sep. 26, 2006, has been disclaimed.

Int. Cl.[5] A23G *3/00*; A61K *7/00, 7/06, 31/70*

U.S. Cl. 514—53 **10 Claims**

1. A dehydrated product containing crystalline β-maltose hydrate obtained by the method comprising incorporating anhydrous maltose as a desiccant into a hydrous matter to convert the anhydrous maltose into crystalline betamaltose hydrate, and dehydrating the hydrous matter.

4,996,197

PHARMACEUTICAL AND/OR COSMETIC COMPOSITION FOR LOCAL USE CONTAINING RHAMSAN GUM

Claude Mazuel, Riom, France, assignor to Laboratoires Merck Sharp & Dohme-Chibret, Paris, France

Filed Jul. 25, 1988, Ser. No. 223,572

Claims priority, application France, Jul. 20, 1987, 87 10211

Int. Cl.[5] A61K *31/715*

U.S. Cl. 514—54 **3 Claims**

1. An ophthalmic composition comprising Rhamsan gum and at least one ophthalmic pharmacologically active substance.

4,996,198

ANTICOCCIDIAL COMPOSITION

Eugene G. Schildknecht, Hacketts Town, and Govind G. Untawale, Wayne, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Jul. 11, 1988, Ser. No. 217,488

Int. Cl.[5] A61K *31/505, 31/635, 34/00*

U.S. Cl. 514—157 **4 Claims**

1. A composition for combating coccidiosis in animals, which comprises sulfadimethoxine, ormetoprim and lasalocid, wherein these ingredients are present in amounts which in combination are synergistically effective in combating at least one coccidiosis-causing strain of Eimeria.

4,996,199

PENETRATION ENHANCERS FOR TRANSDERMAL DELIVERY OF SYSTEMIC AGENTS

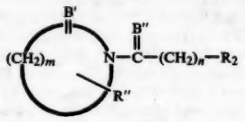
Gevork Minaskanian, Irvine, and James V. Peck, Costa Mesa, both of Calif., assignors to Whitby Research, Inc., Irvine, Calif.

Continuation-in-part of Ser. No. 179,144, Apr. 8, 1988. This application Jun. 20, 1988, Ser. No. 199,801

Int. Cl.[5] A61K *31/56, 31/59*

U.S. Cl. 514—167 **1 Claim**

1. A method for topically administering systemically active agents through the skin or mucosal membranes of humans and animals, which method comprises the topical administration of effective amounts of a systemically active steroid and a membrane penetration enhancer having the structural formula



wherein
R_2 is $-CH_3$, wherein R' is $-(CH_2)_yCOOR_1$, wherein Y is zero and R_1 is hydrogen;
wherein B' represents oxygen;
wherein B'' represents two hydrogen radicals; and
wherein m is 3 and n is 10.

4,996,200

USE OF ZN-PROTOPORPHYRIN FOR HEPATITIS TREATMENT

Yasuhiro Nishimura, Fujiidera; Motoko Suzuki, Ibaraki, and Yozo Fukuda, Toyonaka, all of Japan, assignors to Hamair Chemicals, Ltd., Osaka, Japan

Continuation of Ser. No. 150,397, Jan. 29, 1988, abandoned. This application Oct. 18, 1989, Ser. No. 423,700
Claims priority, application Japan, Feb. 6, 1987, 62-26776
Int. Cl.[5] A61K *49/00*; A61F *31/585*
U.S. Cl. 514—185 **4 Claims**

1. A method for suppressing the increase of glutamic-oxaloacetic transaminase and glutamic-pyruvic transaminase in the serum of a patient suffering from hepatitis, which comprises administering orally a therapeutically effective amount of protoporphyrin IX-Zn(II) complex to said patient exhibiting said elevated levels of glutamic-oxaloacetic transaminase and glutamic-pyruvic transaminase in said serum.

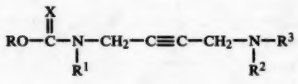
4,996,201

4-(N-SUBSTITUTED AMINO)-2-BUTYNYL-1-CARBAMATES AND THIOCARBAMATES AND DERIVATIVES THEREOF AS CENTRALLY ACTING MUSCARINIC AGENTS

Stephen C. Bergmeier; Jeffrey A. Kester; Walter H. Moos; Haile Tecle, and Anthony J. Thomas, all of Ann Arbor, Mich., assignors to Warner-Lambert Co., Morris Plains, N.J.

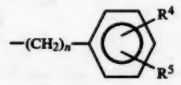
Filed Aug. 2, 1989, Ser. No. 388,777
Int. Cl.[5] A61K *31/395*; C07D *223/04*
U.S. Cl. 514—212 **6 Claims**

1. A compound of formula I

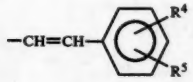


I

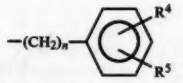
wherein
R is
alkyl of from one to six carbon atoms,
alkyl of from one to six carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms,
alkenyl of from two to six carbon atoms,
alkenyl of from two to six carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms,
alkynyl of from two to six carbon atoms,
alkynyl of from two to six carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms,
cycloalkyl of from three to six carbon atoms,



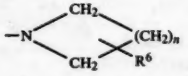
wherein n is zero or an integer of one to eight and R^4 and R^5 are independently hydrogen, fluorine, chlorine, bromine, hydroxy, alkyl of from one to three carbon atoms, or alkoxy of from one to four carbon atoms, or



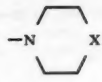
wherein
R^4 and R^5 are as defined above;
X is oxygen or sulfur;
R^1 is
alkyl of from one to six carbon atoms,
alkyl of from one to six carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms,
alkenyl of from three to six carbon atoms
alkenyl of from three to six carbon atoms substituted with hydroxy or alkoy of from one to four carbon atoms,
alkynyl of from three to six carbon atoms,
alkynyl of from three to six carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms,
cycloalkyl of from three to six carbon atoms, or



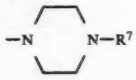
wherein n, R^4 and R^5 ar as defined above;
R^2 and R^3 are each independently
hydrogen,
alkyl of from one to twenty carbon atoms,
alkyl of from one to twenty carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms,
alkenyl of from three to twenty carbon atoms,
alkenyl of from three to twenty carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms,
alkynyl of from three to twenty carbon atoms,
alkynyl of from three to twenty carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms,
cycloalkyl of from three to eight carbon atoms,
phenyl,
phenyl substituted with alkyl of from one to four carbon atoms, alkyl of from one to four carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms, alkoxy of from one to four carbon atoms, chlorine, bromine, hydroxy, nitro or trifluoromethyl or
R^2 and R^3 are taken together with the nitrogen atom to which they are attached to form a ring denoted by



wherein R^6 is hydrogen, alkyl of from one to ten carbon atoms, alkyl of from one to ten carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms, alkenyl of from two to ten carbon atoms, alkenyl of from two to ten carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms, alkynyl of from two to ten carbon atoms or alkynyl of from two to ten carbon atoms substituted with hydroxy or alkoxy of from one to four carbon atoms and n is as defined above,



wherein X is as defined above or



wherein R^7 is hydrogen or alkyl of from one to six carbon atoms, or

a pharmaceutically acceptable acid addition salt thereof.

5. A method of treating the symptoms of cognitive decline in an elderly patient comprising a cholinergically effective amount of a compound according to claim 1.

4,996,202

1,2,4,5 TETRAHYDRO BENZAZEPINE-3 COMPOUNDS AND ANTIPSYCHOTIC USE THEREOF

Joel G. Berger, Cedar Grove; Wei K. Chang, Livingston; Elijah H. Gold, West Orange, all of N.J., and Arthur J. Elliott, Sloatsburg, N.Y., assignors to Schering Corporation, Kenilworth, N.J.

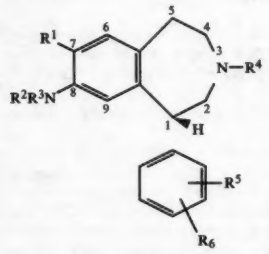
Continuation-in-part of Ser. No. 522,948, Aug. 12, 1983, abandoned. This application Oct. 17, 1985, Ser. No. 788,274

Int. Cl.[5] C07D *223/16, 413/04, 403/04;* **A61K** *31/55*

U.S. Cl. 514—213 **35 Claims**

1. A compound having the structural formula:

I



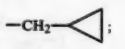
wherein

R^1 is hydrogen, halogen, alkyl, alkoxy, or trifluoromethyl;

R^2 is hydrogen, alkyl, arylalkyl or $COXR^a$ (wherein R^a is hydrogen or alkyl and X is a bond or NH);

R^3 is hydrogen or alkyl;

R^4 is alkyl, $—CH_2CH=CH_2$ or



R^5 and R^6 are the same or different and are independently selected from hydrogen, alkyl, trifluoromethyl, halogen, OR^a (wherein R^a is defined above) or together R^5 and R^6 form $—OCH_2O—$; and the pharmaceutically acceptable salts thereof.

4,996,203

2,5-DIARYL TETRAHYDROFURANS AND ANALOGS THEREOF AS PAF ANTAGONISTS

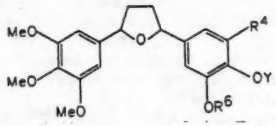
Tesfaye Biftu, Parlin; Robert L. Bugianesi, Colonia; Nirindar N. Girotra, Parlin; Mitree M. Ponpipom, Branchburg; Soumya P. Sahoo, Edison, and Chan H. Kuo, South Plainfield, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 135,862, Dec. 21, 1987, abandoned, which is a continuation-in-part of Ser. No. 852,607, Apr. 16, 1986, abandoned, which is a continuation-in-part of Ser. No. 725,687, Apr. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 551,666, Nov. 11, 1983, Pat. No. 4,539,332. This application Jun. 8, 1989, Ser. No. 362,915

Int. Cl.[5] C07D *405/12, 413/12;* **A61K** *31/54, 31/495*

U.S. Cl. 514—231.5 **17 Claims**

1. A compound of the following structural formula:



wherein:

R^4 is $S(O)_nR^2$, in which n is 0, 1 or 2, and R^2 is selected from the group consisting of

(a) C_{1-6} alkyl,

(b) substituted C_{1-6} alkyl wherein the substituent is selected from the group consisting of hydroxy, and amino,

(c) C_{2-6} alkenyl,

(d) C_{1-6} alkylcarbonyl-C_{1-6} alkyl,

(e) N-substituted C_{1-6} aminoalkyl, wherein the substituents is C_{1-6} alkyl, and

(f) N,N-di-substituted C_{1-6} aminoalkyl, wherein the substituents each independently represent C_{1-6} alkyl;

Y is selected from the group consisting of

(a) C_{1-12} alkyl,

(b) substituted C_{1-8} alkyl, wherein the substituent is selected from the group consisting of hydroxy, and amino,

(c) C_{1-8} alkoxy-C_{1-6} alkyl,

(d) C_{2-6} alkenyl,

(e) C_{1-6} alkyl, $S(O)_m$-C_{1-6} alkyl in which m is 0, 1 or 2;

R^6 is selected from the group consisting of

(a) morpholinyl-C_{1-6} alkyl,

(b) pyrrolidinyl-C_{1-6} alkyl,

(c) piperidinyl-C_{1-6} alkyl,

(d) thiazolinyl$_{1-6}$ alkyl,

(e) morpholinyl-C_{1-6} hydroxyalkyl,

(f) piperazinyl-C_{1-6} alkyl, and

(g) N/substituted piperazinyl-C_{1-6} alkyl, wherein the substitutent is C_{1-4} alkyl.

4,996,204

PYRIDO[2,3-D]PYRIDAZINONES AS ALOOSE REDUCTASE INHIBITORS

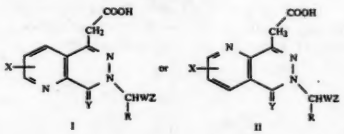
Banavara L. Mylari, Waterford, and William J. Zembrowski, Oakdale, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Filed May 11, 1989, Ser. No. 350,417

Int. Cl.[5] A61K *31/50;* **C07D** *471/04*

U.S. Cl. 514—248 **22 Claims**

1. A compound of the formula:



or a C_1–C_6 alkyl ester thereof, or a base salt of said formula I or II acid with a pharmacologically acceptable cation, wherein R is hydrogen or methyl;

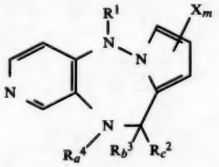
W is —(CH_2)— wherein n is zero or one; or
R and W, when taken together with the central carbon atom to which they are attached to form RCHW, complete a vinylene group;
X is hydrogen, fluorine, chlorine, bromine, trifluoromethyl, C_1–C_4 alkyl, C_1–C_4 alkoxy or C_1–C alkylthio;
Y is oxygen or sulfur; and
Z is phenyl, benzothiophen-2-yl, benzoxazol-2yl, benzothiazol-2-yl or phenyl-1,2,4-oxadiazol-3-yl, wherein said phenyl, benzothiophenyl, benzoxazolyl, benzothiazolyl and phenyloxadiazolyl groups are each optionally monosubstituted or disubstituted on the benzene ring, the substituents for monosubstitution being selected from fluorine, chlorine, bromine, trifluoromethyl, C_1–C_4 alkyl, C_1–C_4 alkoxy and hydroxy and the substituents for disubstitution being identical or non-identical, with said identical substituents being selected from fluorine, chlorine, bromine, trifluoromethyl, C_1–C_4 alkyl and C_1–C_4 alkoxy and said non-identical substituents being selected from fluorine, chlorine, bromine, trifluoromethyl, methyl, methoxy and hydroxy.

4,996,205
COMPOSITION AND METHOD OF USE OF PYRIDO[3,4-F]PYRROLO[1,2-B][1,2,5]TRIAZEPINES

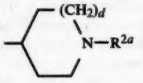
Richard C. Effland, Bridgewater; Larry Davis, Sergentsville; Kevin J. Kapples, Little York, and Gordon E. Olsen, Somerset, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Division of Ser. No. 397,922, Aug. 24, 1989, Pat. No. 4,914,103, which is a division of Ser. No. 223,847, Jul. 25, 1988, Pat. No. 4,879,382. This application Jan. 19, 1990, Ser. No. 468,402
Int. Cl.[5] A01N *43/58*
U.S. Cl. 514—250 **4 Claims**

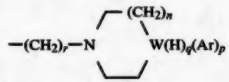
1. A pharmaceutical composition which comprises an effective memory enhancing amount of a compound of the formula:



wherein R^1 is loweralkyl, arylloweralkyl, or aminoloweralkyl; R^2 is hydrogen, loweralkyl, arylloweralkyl, aminoloweralkyl, aryl or a group of the formula



wherein d is an integer having a value of zero or 1 and R^{2a} is hydrogen, loweralkyl, arylloweralkyl or aminoloweralkyl; R^3 is hydrogen or loweralkyl, or together with R^2 constitutes a radical of the formula=O; R^4 is hydrogen, loweralkyl, arylloweralkyl, aminoloweralkyl, formyl, loweralkylcarbonyl, aminocarbonyl, arylaminocarbonyl, or a group of the formula



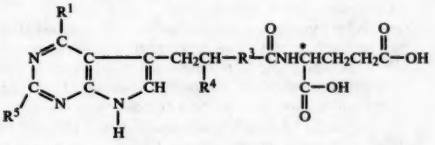
wherein W is carbon or nitrogen, Ar is aryl, q is an integer having a value from zero to 2, inclusive, p is an integer having a value of zero or 1, with the proviso that the sum of p and q is 1 when W is nitrogen and 2 when W is carbon, n is an integer having a value of zero or 1, and r is an integer having a value from 2 to 4, inclusive; X is halogen, loweralkyl, loweralkenyl, formyl or loweralkanol; m is an integer having a value of zero or 1; the dotted line is an optional bond; and a, b, and c, are integers having values of zero or one with the proviso that in the presence of said optional bond a is zero and the sum of b plus c is one, and in the absence of said optional bond a, b, and c each have a value of 1; and a suitable carrier therefor.

4,996,206
N-(PYRROLO[2,3-D]PYRIMIDIN-3-YLACYL)-GLUTAMIC ACID DERIVATIVES

Edward C. Taylor, Princeton, N.J.; Dietmar G. Kuhnt, Leverkusen, Fed. Rep. of Germany; Chuan Shih, and Gerald B. Grindey, both of Indianapolis, Ind., assignors to The Trustees of Princeton University, Princeton, N.J.

Continuation-in-part of Ser. No. 448,742, Dec. 11, 1989, abandoned. This application May 24, 1990, Ser. No. 528,805
Int. Cl.[5] A61K *31/505*; C07D *487/04*
U.S. Cl. 514—258 **15 Claims**

1. A compound of the formula:



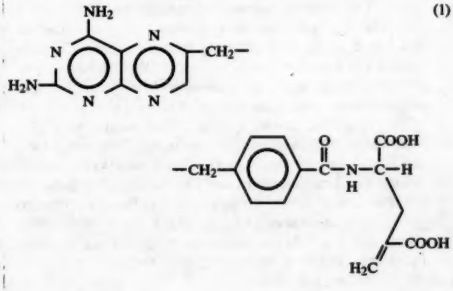
in which:
R^1 is -OH or -NH_2;
R^3 is 1,4-phenylene or 1,3-phenylene unsubstituted or substituted with chloro, fluoro, methyl, methoxy, or trifluoromethyl; thienediyl or furanediyl unsubstituted or substituted with chloro, fluoro, methyl, methoxy, or trifluoromethyl; cyclohexadiyl; and alkanediyl of two to four carbon atoms;
R^4 is hydrogen, methyl, or hydroxymethyl; and
R^5 is hydrogen or alkyl of 1 to 6 carbon atoms; the configuration about the carbon atom designated * is S; and
the pharmaceutically acceptable salts thereof.

4,996,207
THREE NEW NON-POLYGLUTAMATABLE DEAZAAMINOPTERINS

Madhavan G. Nair, 7005 Charleston Oaks Dr., Mobile, Ala. 36695, and Ann Abraham, 375 Hillcrest Rd., E-101, Mobile, Ala. 36608

Filed Jan. 18, 1990, Ser. No. 467,025
Int. Cl.[5] C07D *475/08*
U.S. Cl. 514—258 **9 Claims**

1. 4-Amino-4-deoxy-10-deazapteroyl-Y-methyleneglutamic acid having the formula:



4,996,208

PESTICIDAL THIAZOLOPYRIMIDINE DERIVATIVES

Werner Lindner, Cologne, and Wilhelm Brandes, Leichlingen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

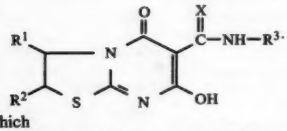
Filed Jun. 19, 1989, Ser. No. 367,820

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1988, 3821711

Int. Cl.[5] A61K *31/495;* C07D *495/04*

U.S. Cl. 514—258 9 Claims

1. A thiazolopyrimidine derivative of the formula



(I)

in which

R^1 stands for hydrogen or for straight-chain or branched alkyl having 1 to 6 carbon atoms,

R^2 stands for hydrogen, for straight-chain or branched alkyl having 1 to 6 carbon atoms or for phenyl which is optionally monosubstituted to trisubstituted by identical or different substituents from the group consisting of halogen, cyano, nitro, alkyl having 1 to 4 carbon atoms, halogenoalkyl having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, alkoxy having 1 to 4 carbon atoms, halogenoalkoxy having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, alkylthio having 1 to 4 carbon atoms, halogenoalkylthio having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, alkylsulphinyl having 1 to 4 carbon atoms, halogenoalkylsulphinyl having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, alkylsulphonyl having 1 to 4 carbon atoms and halogenoalkylsulphonyl having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms,

R^3 stands for straight-chain or branched alkyl which has 1 to 6 carbon atoms and which is optionally substituted by halogen, cyano or alkoxycarbonyl having 1 to 4 carbon atoms in the alkoxy radical, for cycloalkyl which has 3 to 6 carbon atoms and which is optionally monosubstituted to trisubstituted by identical or different substituents from the group consisting of halogen, cyano and alkoxycarbonyl having 1 to 4 carbon atoms in the alkoxy radical, or for phenyl, phenylcarbonyl or phenylsulphonyl each of which is optionally monosubstituted to trisubstituted by identical or different substituents from the group consisting of halogen, cyano, nitro, phenyl, phenoxy (which is optionally substituted by a trifluoromethyl group and/or one to 3 halogen atoms), alkyl having 1 to 4 carbon atoms, halogenoalkyl having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, alkoxy having 1 to 4 carbon atoms, halogenoalkoxy having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, alkylthio having 1 to 4 carbon atoms, halogenoalkylthio having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, alkylsulphinyl having 1 to 4 carbon atoms, halogenoalkylsulphinyl having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, alkylsulphonyl having 1 to 4 carbon atoms and/or halogenoalkylsulphonyl having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, or for phenyl which is fused to a benzo group or to an alkanediyl group which has up to 4 carbon atoms and which is optionally interrupted once or twice by oxygen and/or a carbonyl group, and

X stands for oxygen or sulphur.

4,996,209

OPHTHALMIC ANTIINFLAMMATORY COMPOSITIONS COMPRISING S(+)-FLURBIPROFEN

K. Roger Aoki, Fort Worth, Tex., assignor to Alcon Laboratories, Inc., Fort Worth, Tex.

Continuation of Ser. No. 208,449, Jun. 20, 1988, abandoned.

This application Jun. 4, 1990, Ser. No. 532,482

Int. Cl.[5] A01N *43/90, 43/42;* A61K *31/52, 31/44*

U.S. Cl. 514—263 3 Claims

1. An ophthalmic, antiinflammatory composition for topical application to the eye consisting essentially of a therapeutically effective amount of S(+)-flurbiprofen substantially free of R(−)-flurbiprofen, and a pharmaceutically acceptable vehicle therefor.

4,996,210

HETEROCYCLIC SPIRO COMPOUNDS AND METHODS FOR PREPARING THE SAME

Shin-ichi Tsukamoto; Hitoshi Nagaoka, both of Tokyo; Shinji Usuda, Ibaragi; Masatomi Harada, Saitama, and Toshinari Tamura, Saitama, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

Division of Ser. No. 254,375, Oct. 5, 1988, Pat. No. 4,940,795.

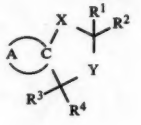
This application Jan. 25, 1990, Ser. No. 470,091

Claims priority, application Japan, Oct. 5, 1987, 62-252104; Nov. 12, 1987, 62-286297; Apr. 5, 1988, 63-84327

Int. Cl.[5] A61K *81/445;* C07D *491/07*

U.S. Cl. 514—278 9 Claims

1. A compound of the formula:



(I)

wherein

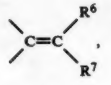
represents a piperidine ring of which the nitrogen atom may have substituent(s) selected from lower alkyl, lower alkanoyl or lower alkoxycarbonyl, and of which the nitrogen atom in the piperidine ring may be connected to any position carbon (which is not the common carbon atom of the spiro structure) via lower alkylene,

X represents an oxygen atom,

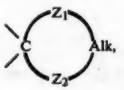
Y represents a carbonyl group

a thiocarbonyl group

a group of the formula >CH—R^5, a group of the formula



or a group of the formula



R^1, R^2 and R^3, which are the same or different, each represents a hydrogen atom or a lower alkyl group,

R^4 represents a hydrogen atom, a lower alkyl group, a carboxy group, a lower alkoxycarbonyl, or a lower alkanoyl,

R^5 represents a halogen atom, a hydroxyl group, a mercapto group, a lower alkoxy group, a lower alkylthio group, a lower alkanoyloxy group, or a lower alkanoylthio group,

R^6 and R^7, which are the same or different, each represents a hydrogen atom or a lower alkyl group,

Z_1 and Z_2, which are the same or different, each represents an oxygen atom or a sulfur atom,

Alk represents a lower alkylene group; or a salt of the formula (I) compound, with the proviso that when

represents methylpiperidyl, R^2-R^4 represent hydrogen, and R^1 represents lower alkyl, then Y does not represent carbonyl or vinylidene.

9. A pharmaceutical composition useful for activating cholinergic function in the central nervous system, said composition comprised of from about 0.001 mg to about 500 mg of the compound of claim 1 and a pharmaceutically acceptable carrier.

4,996,211
SUBSTITUTED DIBENZOCYCLOHEPTENIMINES

Raymond Baker, Much Hadham; Paul D. Leeson, Cambridge, both of England, and Susan F. Britcher, Norristown, Pa., assignors to Merck Sharp & Dohme Ltd., Hoddesdon, England

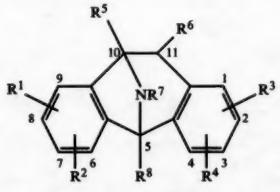
Filed Aug. 12, 1988, Ser. No. 231,295

Claims priority, application United Kingdom, Aug. 13, 1987, 8719199

Int. Cl.[5] C07D *221/22*; A61K *31/44*

U.S. Cl. 514—289 **11 Claims**

1. A compound of formula (I):



(I)

or a pharmaceutically acceptable salt thereof, wherein one of R^1, R^2, R^3 and R^4 represents a hydrocarbon having up to 18 carbon atoms, a group of formula $—CO_2R$ or substituted hydrocarbon wherein the substituent is selected from the group consisting of halogen, C_{1-6} alkyl, phenyl, C_{1-6} alkoxy, halo(C_{1-6})alkyl, hydroxy, amino, nitro, cyano, carboxy, C_{1-6} alkoxycarbonyl, C_{1-6} alkoxycarbonyl (C_{1-6})alkyl, C_{1-6} alkylcarbonyloxy, C_{1-6} alkylcarbonyl and groups of formula $—CONR^aR^b$ and $—NR^a$. COR^b in which R^a and R^b independently represent hydrogen or hydrocarbon having up to 18 carbon atoms and the remaining groups R^1, R^2, R^3 and R^4 are independently selected from the group consisting of hydrogen, hydrocarbon, substituted hydrocarbon wherein the substituents are as defined above, $—CO_2R$, halogen, hydroxy and C_{1-6} alkoxy or R^1 and R^2 or R^3 and R^4, when present on adjacent carbon atoms, may together represent the residue of a carbocyclic ring, the R_1/R^2 or R^3/R^4 carbon chain comprising from 2–6 carbon atoms; R represents a hydrocarbon having up to 18 carbon atoms or substituted hydrocarbon group wherein the substituents are as defined above; R^5 and R^6 are independently selected from the group consisting of hydrogen, hydrocarbon having up to 18 carbon atoms, hydroxy and fluoro; R^7 represents hydrogen of C_{1-3} alkyl; and R^8 represents methyl or ethyl.

4,996,212
ANTIINFLAMMATORY AND ANTI-HYPERPROLIFERATIVE COMPOUNDS

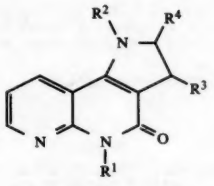
Timothy Duelfer, Morris Plains, and David J. Blythin, North Caldwell, both, N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Dec. 21, 1989, Ser. No. 454,658

Int. Cl.[5] C07D *471/14*; A61K *31/435*

U.S. Cl. 514—293 **18 Claims**

1. A compound having the structural formula I



I

or a pharmaceutically acceptable salt or solvate thereof, wherein:

R^1 is selected from H, alkyl having from 1 to 10 carbon atoms, aryl having from 6 to 15 carbon atoms, alkenyl having from 3 to 10 carbon atoms, benzyl, substituted alkyl having from 1 to 10 carbon atoms substituted aryl having from 6 to 15 carbon atoms, or substituted benzyl;

R^2 is selected from H, alkyl having from 1 to 10 carbon atoms, aryl having from 6 to 15 carbon atoms, alkenyl having from 3 to 10 carbon atoms, benzyl, substituted alkyl having from 1 to 10 carbon atoms, substituted aryl having from 6 to 15 carbon atoms, substituted benzyl, $—O(CO)—R^8$, $—D—NR^5R^6$, $—D—OR^7$ or $—D—(CO)—OR^8$ wherein D is alkanediyl having from 1 to 8 carbon atoms or a covalent bond; R^3 and R^4 are the same or different and each is independently selected from H, alkyl having from 1 to 10 atoms, aryl having from 6 to 15 carbon atoms or heteroaryl selected from the group consisting of pyridyl, furyl, thienyl, thiazolyl, imidazolyl, pyrimidinyl, pyrazinyl, pyridazinyl, 1,2,4-triazinyl, benzofuranyl, indolyl, pyrazolyl, and oxazolyl having from 2 to 14 carbon atoms;

R^5 and R^6 are the same or different and each is independently selected from H or alkyl having from 1 to 10 carbon atoms or together represent alkanediyl having from 1 to 8 carbon atoms;

R^7 is selected from H, alkyl having from 1 to 10 carbon atoms or aryl having from 6 to 15 carbon atoms; and

R^8 is selected from alkyl having from 1 to 10 carbon atoms, aryl having from 6 to 15 carbon atoms benzyl or substituted benzyl.

4,996,213

DERIVATIVES OF 4-AMINO 3-CARBOXY NAPHTHYRIDINES AND THEIR PHARMACEUTICAL COMPOSITIONS

Etienne Mendes, Toulouse; Jean-Claude Vernieres; Jacques Simiaud, both of Muret, and Peter E. Keane, Portet-Sur-Garonne, all of France, assignors to SANOFI, Paris, France

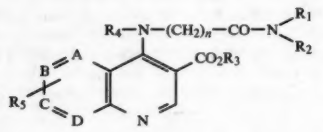
Filed Jun. 6, 1989, Ser. No. 362,104

Claims priority, application France, Jun. 9, 1988, 88 07723

Int. Cl.[5] A61K *31/44;* **C07D** *471/04*

U.S. Cl. 514—300 **4 Claims**

1. A compound of formula I:



I

in which R_1 and R_2 are independently selected from hydrogen, C_1–C_6 alkyl, phenyl optionally substituted by at least one group selected from the class consisting of C_{1-6} alkyl, C_{1-6} alkoxy, trifluoromethyl, nitro, and halogen, or benzyl optionally substituted by at least one group selected from the class consisting of C_{1-6} alkyl, C_{1-6} alkoxy, trifluoromethyl, nitro, or halogen, or R_1 and R_2 may form together with the nitrogen atom to which they are attached a C_4–C_8 saturated heterocycle, R_3 and R_4 are independently selected from hydrogen or C_1–C_6 alkyl, R_5 is selected from hydrogen or halogen, or C_1–C_4 alkyl, C_1–C_4 alkoxy, nitro or trifluoromethyl, n is 1, 2 or 3, and one of the symbols A, B, C or D represents N and the others represent CH, as well as the N-oxides of the heterocyclic nitrogens and their addition salts with pharmaceutically acceptable acids and bases.

4. Pharmaceutical composition containing as active ingredient a compound according to claim **1** and an excipient.

4,996,214

QUINOLINYL SUBSTITUTED PHENYL/THIOALKANOIC ACID SUBSTITUTED PROPIONIC ACIDS AND LEUCOTRIENE ANTAGONIST USE THEREOF

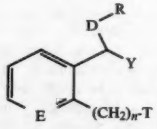
Russell D. Cousins, Oxford, Pa.; James S. Frazee, Sewell, N.J.; John G. Gleason, Downington, and Ralph F. Hall, Villanova, both of Pa., assignors to SmithKline Beecham Corporation, Philadelphia, Pa.

Filed Jun. 28, 1990, Ser. No. 545,258

Int. Cl.[5] A61K *31/41, 31/47;* **C07D** *401/06, 215/14*

U.S. Cl. 514—311 **20 Claims**

1. A compound of formula I



I

or a pharmaceutically acceptable salt thereof wherein

E is CH or N;

D is O or $S(O)_q$ is 0, 1 or 2;

R is $—(CH_2)_nA$, $—(CH_2)_nArA$ or ArA where n is 1–4, Ar is phenyl or substituted phenyl, thienyl; pyridyl, imidazolyl, tetrazol-5-yl or thiazolyl and A is $—(CH_2)_nR_2$, $—R_2$, —CN, $—SO_3H$, $—SO_2NH_2$, $NHSO_2R_6$, $—CH(NH_2)COR_4$, or $—CONHCH_2COR_4$;

Y is R_2, $CH(R_3)(CH_2)_mR_2$, $CH(R_3)$-tetrazol-5-yl, or tetrazol-5-yl;

m is 0, 1, and 2;

R_3 is hydrogen, C_1 to C_4 alkoxy, fluoro or hydroxy;

R_2 is $—COR_4$ where R_4 is —OH, —OE where E is a pharmaceutically acceptable cation or a pharmaceutically acceptable ester-forming group, R_2 is $—CON(R_5)_2$ where R_5 is H, C_1 to C_6 alkyl, phenylC_1–C_6-alkyl, or the two R_5 groups are combined to form a cyclic group having 3 to 5 carbons, $—SO_3H$, $—SO_2NH_2$, $NHSO_2R_6$, $—CH(NH_2)COR_4$, or $—CONHCH_2COR_4$;

R_6 is C_1 to C_{10}-alkyl, phenyl, or phenylC_1 to C_3-alkyl.

n is 4–11; and

T is halosubstituted quinolyl.

18. A method of treating a pulmonary disease in which leukotrienes are a factor in a subject in need thereof comprising administering to such subject an effective amount of a compound of claim **1** either alone or in combination with a pharmaceutically acceptable excipient.

4,996,215

PIPERIDINE DERIVATIVE AND PHARMACEUTICAL COMPOSITION CONTAINING THE SAME

Hitoshi Oinuma, Ibaraki; Motosuke Yamanaka, Abiko; Kazutoshi Miyake, Ushiku; Tomonori Hoshiko, Tsuchiura; Norio Minami, Sakura; Tadao Shoji, Kukizakimachi; Yoshiharu Daiku, Sakuramura; Kohei Sawada, Toride, and Kenichi Nomoto, Tsuchiura, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

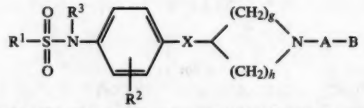
Division of Ser. No. 16,035, Feb. 18, 1987, Pat. No. 4,876,262. This application Sep. 15, 1989, Ser. No. 408,106

Claims priority, application Japan, Feb. 26, 1986, 61-39270

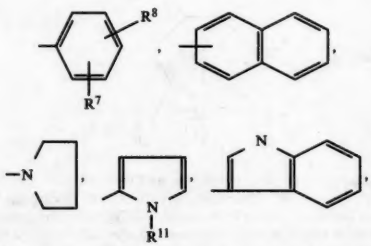
Int. Cl.[5] A61K *31/40, 31/435;* **C07D** *207/09, 211/28*

U.S. Cl. 514—316 **9 Claims**

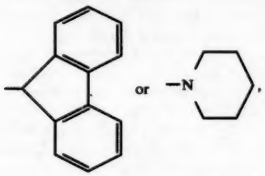
1. A compound having the formula



in which R^1 is a lower alkyl or a tolyl; R^2 is hydrogen, hydroxyl, a lower alkoxy or a lower alkyl; R^3 is hydrogen, a lower alkyl, a lower alkenyl, a cycloalkyl or a cycloalkylalkyl; X is —CO—, $—CH_2—$ or —CHOH—; g is an integer of 1, 2 or 3; h is an integer of 1, 2 or 3, with the proviso that the sum of g plus h equals the integers 3 or 4; A is (1) alkylene having 1 to 5 carbon atoms, (2) straight-chain alkylene having 1 to 5 carbon atoms in the chain and substituted with lower alkyl, phenyl or hydroxyl, (3) straight-chain alkenylene having 2 to 5 carbon atoms, (4) $—(CH_2)_k—S—$, wherein k is an integer of 2 to 5, or (5) $—(CH_2)_pCO—$, wherein p is an integer of 1 to 4, and B is



-continued



where R^7 and R^8 each are hydrogen, a halogen, a lower alkyl, a lower alkoxy or methanesulfonamido and R^{11} is hydrogen or a lower alkyl, or pharmaceutically acceptable salts thereof.

9. A pharmaceutical composition which comprises a pharmacologically effective amount of the compound defined in claim 1 or a pharmacologically acceptable salt thereof and a pharmacologically acceptable carrier.

4,996,216

PHENOXYALKYL-SUBSTITUTED HETEROAROMATICS AND THEIR USE FOR CONTROLLING PESTS

Joachim Leyendecker, Ladenburg; Hans-Juergen Neubauer, Muenster-Hiltrup; Uwe Kardorff, Mannheim; Christoph Kuenast, Otterstadt; Peter Hofmeister, Neustadt, and Wolfgang Krieg, Weingarten, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

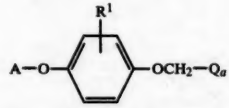
Filed Aug. 4, 1989, Ser. No. 389,815

Claims priority, application Fed. Rep. of Germany, Aug. 5, 1988, 3826681; Aug. 5, 1988, 3826682

Int. Cl.[5] C07D *401/10*; A01N *43/50, 43/52, 43/56*

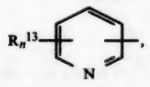
U.S. Cl. 514—338 **7 Claims**

1. A compound of the formula



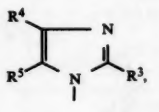
(Ia)

wherein A is



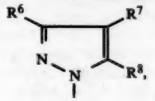
wherein each R^{13} is independently selected from the group consisting of hydrogen halogen, C_{1-4}-alkyl, C_1–C_3-haloalkyl, C_1–C_4-alkoxy, C_1–C_3-haloalkoxy, C_3–C_6-cycloalkyl, cyano and nitro and n is 1 to 4; R^1 is selected from the group consisting of hydrogen, halogen and C_1–C_3 alkyl; and

Qa is a member selected from the group consisting of

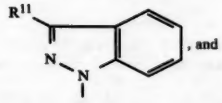


(IIa)

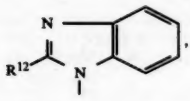
-continued



(IIb)



(IId)



(IIe)

wherein R^3 to R^8 and R^{11} to R^{12} are selected from the group consisting of hydrogen, halogen, C_1–C_8 alkyl, C_1–C_4-haloalkyl, C_1–C_4-alkoxy, C_3–C_{10}-cycloalkyl or aryl which is unsubstituted or mono- to trisubstituted by halogen, C_1–C_3-haloalkoxy.

7. A process for combating pests, wherein the pests, or the areas or spaces to be kept free from pests are treated with a pesticidally effective amount of a phenoxyalkyl-substituted heteroaromatic compound of the formula Ia as set forth in claim 1.

4,996,217

PYRIDYL-SUBSTITUTED IMIDAZOLES, COMPOSITIONS CONTAINING SAME AND METHODS OF USE THEREOF

Yasushi Honma, Ageo; Hajime Tamaki, Sakado; Tetsuo Magaribuchi, Urawa, and Mine Takido, Tokyo, all of Japan, assignors to Tanabe Seiyaku Company, Ltd., Osaka, Japan

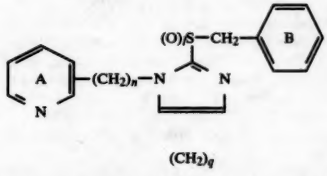
Continuation-in-part of Ser. No. 122,286, Nov. 18, 1987, abandoned. This application Jun. 28, 1989, Ser. No. 372,534

Claims priority, application Japan, Dec. 2, 1986, 61-287512; Mar. 31, 1987, 62-80475; Aug. 28, 1987, 62-215813

Int. Cl.[5] A61K *31/44*; C07D *401/04*

U.S. Cl. 514—338 **25 Claims**

1. An imidazole derivative of the formula:



wherein Ring A is a 2-, 3- or 4-pyridyl group which may be unsubstituted or have one or two substituent(s) selected from the group consisting of halogen, lower alkyl group, lower alkoxy group, phenyl-lower alkoxy group, nitro group, amino group, lower alkanoylamino group, N-lower alkyl-N-lower alkanoylamino group, mono- or di (lower alkyl) amino group, lower alkanoyloxy group, cyano group, trihalogeno-lower alkyl group, trihalogeno-lower alkoxy group, lower alkenyloxy group and hydroxy group; Ring B is phenyl group which may be unsubstituted or have a substituent selected from the group consisting of a nitro group, amino group, mono- or di (lower alkyl) amino group, lower alkanoylamino group, phenylamino group, cycloalkylamino group of 3 of 6 ring

carbon atoms, N- (tri-lower alkylphenyl) sulfonylamino group, N-lower alkyl-N-(tri-lower alkylphenyl) sulfonylamino group, N-lower alkyl-N-phenylamino group, di (lower alkyl) amino-lower alkyl group, N-lower alkyl-N-lower alkanoylamino group, lower alkylsulfonylamino group, formylamino group, lower alkoxy group, benzoylamino group, and lower alkoxycarbonylamino group; l is 0, 1, or 2 and n is 0, 1 or 2; and q is 3 or 4 or a salt thereof.

4,996,218

CHLOROANILINE DERIVATIVES

Lawrence H. C. Lunts, Broxbourne, England, assignor to Glaxo Group Limited, London, England

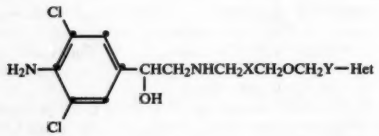
Filed Aug. 10, 1988, Ser. No. 230,358

Claims priority, application United Kingdom, Aug. 11, 1987, 8718939

Int. Cl.[5] A61K *31/395, 31/50, 31/505, 31/53, 31/54, 31/38, 31/435, 31/44, 31/47;* **C07D** *413/04, 277/24, 277/34, 277/38, 277/42, 277/44, 251/18, 251/48*

U.S. Cl. 514—365 **11 Claims**

1. A compound of the formula (I)



or a physiologically acceptable salt or solvate thereof, wherein X represents $-(CH_2)_3-$ or $-(CH_2)_4-$, Y represents $-(CH_2)-$ or $-(CH_2)_2-$, and Het represents a thiazolyl group, optionally substituted by one or two groups selected from C_{1-4} alkyl, C_{1-4} alkoxy, hydroxy, halogen, $-NR^3R^4$ and $-COR^8$, wherein R^3 and R^4 each represent a hydrogen atom or a C_{1-4} alkyl group or $-NR^3R^4$ forms a pyrrolidino, piperidino, hexamethyleneimino, piperazino, N-methylpiperazino, morpholino, homomorpholino, or thiomorpholino group; and R^8 represents hydrogen, C_{1-4} alkoxy or $-NR^3R^4$.

4. A pharmaceutical composition for therapy or prophylaxis of a disease associated with reversible airways obstruction, which comprises an effective amount of alleviate said disease of at least one compound of formula (I) as defined in claim 1 or a physiologically acceptable salt or solvate thereof, together with a physiologically acceptable carrier or excipient.

4,996,219

IMIDAZOLIDINE DERIVATIVES AS IMMUNOSUPPRESSIVES

Christos Tsaklakidis; Elmar Bosies, both of Weinheim; Michael Schultz, Mannheim; Rainer Haag, Ladenburg; Dieter Herrmann, Heidelberg, and Wulf Pahlke, Bensheim, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

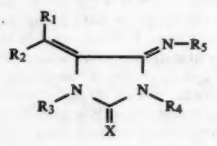
Filed Dec. 13, 1989, Ser. No. 448,129

Claims priority, application Fed. Rep. of Germany, Dec. 13, 1988, 3841879

Int. Cl.[5] A61K *31/44;* **C07D** *401/00, 409/00, 233/30*

U.S. Cl. 514—341 **33 Claims**

1. A compound of the formula



(I)

wherein

R_1 and R_2, which can be the same or different, are a hydrogen atom, a C_1–C_5 alkyl radical, a C_3–C_5 alkenyl radical, a phenyl radical, or R_1 and R_2, together with the carbon atom to which they are attached, form a saturated or unsaturated hydrocarbon C_3-C_7 ring;

R_3 and R_4, which can be the same or different, are a hydrogen atom, a straight chained or branched C_1–C_{10}alkyl radical, a straight-chained or branched C_3-C_7 alkenyl radical, a C_3-C_7 cycloalkyl radical, a C_3-C_7 cycloalkenyl radical, phenyl radical, a C_6-C_{10}-aryl-C_1-C_6-alkyl radical, or a hetaryl-C_1-C_6- alkyl radical wherein the hetaryl group is selected from the consisting of picolyl, thienyl or furfuryl;

R_5 is a hydrogen atom or a lower alkyl radical; and

X is an oxygen or sulfur atom or an imino group.

20. A method of producing an immunosuppressive effect in a patient in need of said effect, said method comprising administering to said patient an immunosuppressive effective amount of a compound of claim 1.

4,996,220

METHOD OF PRODUCING A CLATHRATE COMPOUND

Ayako Sekikawa; Hideo Sugi, and Ryoichi Takahashi, all of Tokyo, Japan, assignors to Kurita Water Industries Ltd., Tokyo, Japan

Division of Ser. No. 295,628, Jan. 10, 1989. This application Apr. 9, 1990, Ser. No. 506,066

Claims priority, application Japan, Jan. 25, 1988, 63-13800

Int. Cl.[5] A01N *25/08, 25/34, 33/26, 43/80*

U.S. Cl. 514—372 **5 Claims**

1. A method of producing a clathrate compound, comprising:

preparing an aqueous solution containing a microbicide,

preparing a host compound in the form of a powder, said host compound, when reacted with said microbicide, forming a clathrate compound together with said microbicide,

adding said powdery host compound into the solution containing the microbicide to react the powdery host compound with the microbicide so that the clathrate compound formed of the host compound and the microbicide is formed, and

separating the formed clathrate compound from the solution.

4,996,221

HISTAMINE DERIVATIVES AS IMMUNE MODULATORS

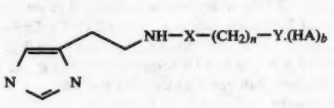
Kenneth L. Melmon, Woodside; Murray Goodman, La Jolla; Manzoor M. Khan, San Carlos; Debra Marr-Leisy, Los Alamitos, and Michael Verlander, Rancho Palos Verdes, all of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Jan. 13, 1987, Ser. No. 2,781

Int. Cl.[5] A61K *31/415;* **C07D** *233/64*

U.S. Cl. 514—399 **16 Claims**

4. Histamine derivatives having binding specificity for H_1 or H_2 receptors of lymphocytes and of the formula



wherein:

X is CO or CHR, where R is an alkyl group of from 1 to 3 carbon atoms;

n is an integer of from 2 to 6;

Y is CH_3 or CONHZ, wherein Z is H; $(CH_2)_mCH_3$, where m is 1 to 4; substituted phenyl, where the substituent is methyl or trifluoromethyl;

A is a physiologically acceptable counterion; and

b is an integer of from 0 to 2.

13. A method of modulating an immune response of lymphocytes, which comprises contacting said lymphocytes with an immunomodulating amount of a compound according to claim 4.

4,996,222

PHARMACEUTICAL FORMULATIONS

Brian A. C. Carlin, Baldock; John N. C. Healey, Hitchin; Graham S. Leonard, St. Albans, and Geoffrey D. Tovey, Harpenden, all of England, assignors to Smith Kline & French Laboratories Limited, Welwyn Garden City, United Kingdom

Continuation of Ser. No. 79,198, Jul. 29, 1987, abandoned. This application Mar. 9, 1990, Ser. No. 490,851

Int. Cl.[5] A61K *31/415*

U.S. Cl. 514—400 16 Claims

1. A stable pharmaceutical composition suitable for oral administration comprising a suspension of an effective histamine H2-antagonist amount of particulate cimetidine in an aqueous phase wherein substantially all of the cimetidine present is of the polymorphic B form.

4,996,223

NEW ORGANIC COMPOUNDS HAVING OPIOID PROPERTIES

John M. H. Rees, Knutsford; Brian Robinson, Glossop, both of United Kingdom, and Brian Cox, Montclair, N.J., assignors to The Victoria University of Manchester, Manchester, United Kingdom

PCT No. PCT/GB87/00457, § 371 Date Feb. 9, 1989, § 102(e) Date Feb. 9, 1989, PCT Pub. No. WO88/00193, PCT Pub. Date Jan. 14, 1988

PCT Filed Jun. 30, 1987, Ser. No. 295,037

Claims priority, application United Kingdom, Jul. 2, 1986, 8616089

Int. Cl.[5] C07D *487/06;* A61K *31/40*

U.S. Cl. 514—410 8 Claims

1. Echiboline derivatives, useful as opiates, having the structure of a 6-hydroxy-9-methyl-echiboline with a hydrocarbon substituent of up to 4 carbon atoms in the 10-position, and salts thereof.

8. Use as an opioid of a compound as claimed in any one of claims 1 to 6 or a composition as claimed in claim 7.

4,996,224

1-BENZYL-4- OR 5-PYRROLIDINOMETHYL-PYRROLIDIN-2-ONES AND NOOTROPIC METHOD OF USE THEREOF

Karl-Heinz Weber, Gau-Algesheim; Gerhard Walther, Bingen/-Rhein; Claus Schneider, Ingelheim/Rhein; Dieter Hinzen, Bingen/Rhein; Franz J. Kuhn, Gau-Algesheim, and Erich Lehr, Waldalgesheim, all of Fed. Rep. of Germany, assignors to Boehringer Ingelheim KG, Ingelheim am Rhein, Fed. Rep. of Germany

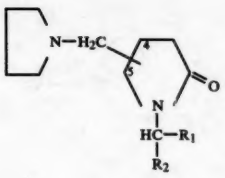
Continuation of Ser. No. 199,291, May 26, 1988, Pat. No. 4,833,140, which is a division of Ser. No. 878,828, Jun. 26, 1986, Pat. No. 4,767,759, which is a continuation-in-part of Ser. No. 657,219, Oct. 3, 1984, abandoned. This application May 11, 1989, Ser. No. 350,597

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1983, 3336024

Int. Cl.[5] C07D *403/06;* A61K *31/40*

U.S. Cl. 514—424 6 Claims

1. A compound of the formula



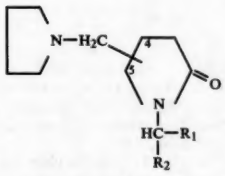
wherein

R_1 is hydrogen or alkyl of 1 to 4 carbon atoms; and

R_2 is phenyl or mono- or di-substituted phynyl, where the substituents are each individually alkoxy of 1 to carbon atoms, fluorine, chlorine, bromine, trifluoromethyl, alkyl or 1 to 4 carbon atoms, hydroxyl or nitro;

where the pyrrolidinomethyl substituent is attached to the 4- or 5position of the pyrrolidien ring, or a non-toxic, pharmacologically acceptable acid addition salt thereof.

5. The method of alleviating conditions of impaired cerebral performance in a warm-blooded animal in need therof, which comprises perorally or parenterally administering to said animal an effective nootropic amount of a compound of the formula



wherein

R_1 is hydrogen or alkyl of 1 to 4 carbon atoms; and

R_2 is phynyl or mono- or di-substituted phenyl, where the substituents are each individually alkoxy of 1 or 2 carbon atoms, fluorine, chlorien, bromine, trifluormethyl, alkyl of 1 to 4 carbon atoms, hydroxyl or nitro; where the pyrrolidinomethyl substituent is attached to the 4- or 5-position of the pyrrolidien ring, or a non-toxic, pharmacologically acceptable acid addition salt thereof.

4,996,225

TRI-PHENYL ALKANE DERIVATIVES AND THEIR OESTROGENIC, ANTI-OESTROGENIC AND PROGESTANIC USES

Reijo J. Toivola; Arto J. Karjalainen; Kauko O. A. Kurkela; Marja-Liisa Soderwall, all of Oulu; Lauri V. M. Kangas, Turku; Guillermo L. Blanco, Oulu, and Hannu K. Sundquist, Kaarina, all of Finland, assignors to Farmos Group Ltd., Turku, Finland

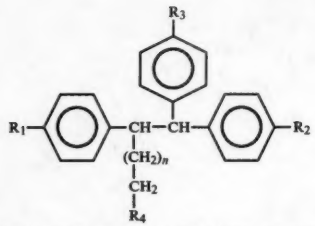
Division of Ser. No. 90,724, Aug. 28, 1987, which is a continuation-in-part of Ser. No. 823,856, Jan. 29, 1986, Pat. No. 4,696,949, which is a continuation of Ser. No. 497,813, May 25, 1983, abandoned. This application Oct. 12, 1989, Ser. No. 420,437

Claims priority, application United Kingdom, Jun. 25, 1982, 8218414

Int. Cl.[5] A61K *31/40;* C07D *207/08*

U.S. Cl. 514—428 7 Claims

1. A compound of the formula:



where n is 0 to 4, R_1, and R_2, which can be the same or different, are H or OH, R_3 is $—O—(CH_2)_m—CH_2—NR_6R_7$ in which m is 1 to 2, R_6 and R_7, which can be the same or different, are H or an alkyl group of 1 to 4 carbon atoms or $—NR_6R_7$ can form a pyrrolidinyl group and R_4 is halogen, or a non-toxic, pharmaceutically acceptable salt or N-oxide thereof.

6. A method of producing an oestrogenic, anti-oestrogenic or progestanic effect in a subject in which such an effect is desired which comprises administering to said subject a compound according to claim 1 or a non-toxic pharmaceutically acceptable salt thereof, in an amount sufficient to produce the desired effect.

4,996,226

METHOD AND COMPOSITIONS FOR TREATMENT OF PARKINSONISM SYNDROME IN MAMMELS

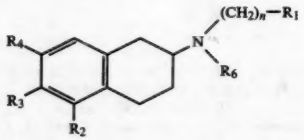
Alan S. Horn, Noordorn, Netherlands, assignor to Whitby Research, Inc., Richmond, Va.

Division of Ser. No. 206,193, Jun. 13, 1988, Pat. No. 4,885,308, and a continuation-in-part of Ser. No. 640,685, Aug. 13, 1984, Pat. No. 4,564,628, and a continuation-in-part of Ser. No. 811,768, Dec. 20, 1985, Pat. No. 4,657,925. This application Sep. 26, 1989, Ser. No. 397,749

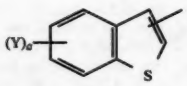
Int. Cl.[5] A61K *31/38*

U.S. Cl. 514—438 **29 Claims**

1. A method for treating the symptoms of parkinsonism in a mammal comprising administering to said mammal an effective amount of one or more compounds selected from a group consisting of optically active or racemic compounds wherein an amount of a negative isomer present therein is an amount effective to treat parkinsonism, said optically active or racemic compounds being represented by the formula:

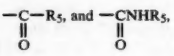


wherein R_1 is



X is sulfur, and Y is hydrocarbyl,

R_2, R_3 and R_4 are each selected from the group consisting of H and OA, A is H or is selected from the group consisting of hydrocarbyl radicals,



R_5 is selected from the group consisting of hydrocarbyl radicals; n is an integer between 1 and 3; and R_6 is an alkyl chain having between 1 and 3 carbon atoms with the provision that at least one of R_2, R_3 and R_4 is H, that at least one of R_2, R_3 and R_4 is not H, and that R_2 and R_4 are not both OA, and pharmaceutically acceptable salts thereof.

4,996,227

3-(HETEROARYLALKYENE)- AND 3-(ARYLALKYLENE)-2,4(3H,5H)-HETEROCYCLIC DIONES AS CANCER CHEMOTHERAPY DRUGS

Hans W. Zimmer, Cincinnati, Ohio; Orlando J. Martelo, Plattsburg, N.Y., and Robert S. Franco, Cincinnati, Ohio, assignors to University of Cincinnati, Cincinnati, Ohio

Continuation-in-part of Ser. No. 878,811, Jun. 26, 1986, abandoned. This application Feb. 24, 1989, Ser. No. 316,591

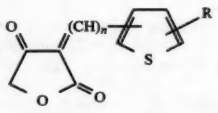
Int. Cl.[5] A61K *31/38*

U.S. Cl. 514—444 **4 Claims**

1. A method of treating mammal having cancerous tumor cells with at least one 3-(heteroarylalkylene) 2,4 (3H,5H) furandione for inhibiting or reducing the growth of said cancerous tumor cells, comprising:

injecting or administering orally a 3-(heteroarylalkylene) 2,4 (3H, 5H) furandione into a mammal having cancerous tumor cells at an effective dosage amount for a sufficient time period to inhibit or reduce said growth of said cancerous tumor cells.

wherein said at least one 3-(heteroarylalkylene) 2, 4 (3H, 5H) furandionehas the general formula:



where R represents hydrogen or alkyls containing 1 to 3 carbon atoms or halogens such as chlorine, fluorine, bromine and iodine; and n is 1 or 3.

4,996,228

MACROLIDE ANTIBIOTICS

Derek R. Sutherland, Chalfont St Giles; Michael V. J. Ramsay, South Harrow; John B. Ward, Bushey; Neil Porter, Pinner; Hazel M. Noble, Burnham; Richard A. Fletton, Ruislip, and David Noble, Burnham, all of England, assignors to American Cyanamid Company, Stamford, Conn.

Filed Mar. 11, 1987, Ser. No. 24,681

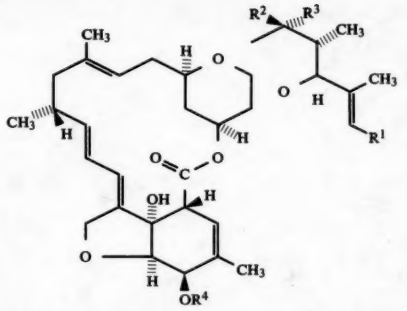
Claims priority, application United Kingdom, Mar. 12, 1986, 8606105

The portion of the term of this patent subsequent to Dec. 18, 2007, has been disclaimed.

Int. Cl.[5] A61K *31/335*; C07D *313/00*

U.S. Cl. 514—450 **8 Claims**

1. A compound of formula (I)



(I)

wherein

R^1 is a methyl, ethyl or isopropyl group;

R^2 is a C_{1-4} alkyl group, optionally substituted by a group CO_2R^5 where R^5 is a hydrogen atom or a C_{1-4} alkyl group; a C_{2-6} alkenyl group; phenyl or phenyl C_{1-3} alkyl group; R^3 is a hydroxy group; and OR^4 is a hydroxy or substituted hydroxy group which is a group $—OCOR^7$, $—OCO_2R^7$ or $—OCSOR^7$, where R^7 is C_{1-8} alkyl, C_{1-8} alkyl substituted by one or more halogen atoms, C_{1-4} alkoxy, phenoxy or silyloxy substituents, C_{2-8} alkenyl, C_{2-8} alkynyl, C_{3-12} cycloakyl, phenylalkyl in which the alkyl portion has 1–6 carbon atoms, or phenyl; a formyloxy group; a group $—OR^8$ where R^8 is as defined above for R^7; a group $—OSO_2R^9$, where R^9 is a C_{1-4} alkyl or toluyl; a silyloxy group; a tetrahydropyranyloxy group; a group $—OCO(CH_2)_nCO_2R^{10}$ where R^{10} is a hydrogen atom or a group as defined for R^7 above and n represents zero, 1 or 2; or a group $OCONR^{11}R^{12}$ where R^{11} and R^{12} each independently represent a hydrogen atom or a C_{1-4} alkyl group.

4,996,229

SCYTOPHYCINS

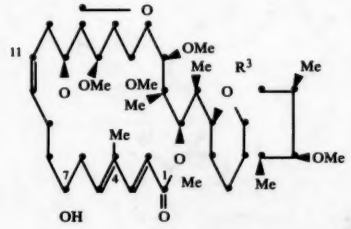
Richard E. Moore; Eiichi Furusawa; Ted R. Norton; Gregory M. L. Patterson, all of Honolulu, Hi., and Jon S. Mynderse, Indianapolis, Ind., assignors to University of Hawaii, Honolulu, Hi. and Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 865,499, May 21, 1986, Pat. No. 4,863,955, which is a continuation-in-part of Ser. No. 741,776, Jun. 6, 1985, abandoned, which is a continuation-in-part of Ser. No. 741,778, Jun. 6, 1985, abandoned. This application Aug. 31, 1989, Ser. No. 401,353

Int. Cl.[5] A61K *31/365;* **C07D** *303/12, 313/08*

U.S. Cl. 514—450 **5 Claims**

1. A compound of the formula



wherein R^3 represents —CHO or $—CH_2OH$, or a C_1–C_6-alkanoyl or benzoyl or halo-, hydroxyl- or C_1–C_3-alkoxy-substituted C_1–C_6-alkanoyl or benzoyl ester derivative thereof.

4,996,230

LEUKOTRIENE ANTAGONISTS

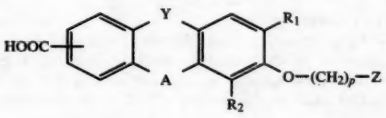
D. Mark Gapinski, Lebanon, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Feb. 16, 1990, Ser. No. 481,413

Int. Cl.[5] A61K *31/35;* **C07D** *311/80*

U.S. Cl. 514—454 **14 Claims**

1. A compound of the formula I



I

or a pharmaceutically acceptable base addition salt thereof, wherein

Y is —CO—, —C(=NOH)—, —CHOH—, $—CH_2—$, or $—C(=CH_2)—$;

A is —O—;

one of R_1 and R_2 is hydrogen and the other of R_1 and R_2 is $—CH_2CH_2COOH$;

p is 1–16; and

Z is —H or —G—Q where

G is a bond, —O—, $—S(O)_t—$, —NH—, —CH=CH—, or —C≡C—,

Q is phenyl or phenyl substituted with one or two substituents selected from the group consisting of halo, C_1–C_3 alkyl, C_1–C_3 alkoxy, acetyl, nitro, amino, trifluoromethyl, hydroxy, and $—S(O)_t—(C_1$–C_3 alkyl), and

each t is independently 0–2.

6. A method of treating a mammal suffering from or susceptible to any condition characterized by an excessive release of leukotrienes, which comprises administering to said mammal a leukotriene antagonizing amount of a compound of claim 1 or a pharmaceutically acceptable base addition salt thereof.

4,996,231

TRIYNE CYCLIC CARBONATES

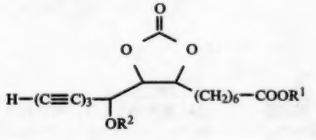
Michael N. Chang, Westfield; Yuan-Ching P. Chiang, Piscataway; James V. Heck, Scotch Plains, and Michael D. Lewis, Rahway, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 156,107, Feb. 16, 1988, abandoned. This application Aug. 8, 1989, Ser. No. 391,769

Int. Cl.[5] A61K *31/335;* **C07D** *317/24*

U.S. Cl. 514—467 **3 Claims**

1. A compound of the formula:



wherein R^1 is:

(a) hydrogen;

(b) C_1–C_6 alkyl; or

(c) a pharmaceutically acceptable cation; and

R^2 is C_1–C_6 alkyl.

3. A pharmaceutical composition useful in the treatment of fungal diseases comprising a therapeutically effective amount of at least one compound according to claim 1, together with one or more non-toxic pharmaceutically acceptable carriers.

4,996,232

REDUCING BACTERIAL CONTENT IN WATER

Michael Gracey, Wembley; Frank Hopkins, Glenfield; Jennifer Robinson, Floreat Park, and Stephen Snow, Bargo, all of Australia, assignors to Cadbury Schweppes Proprietary Limited, Melbourne, Australia

Continuation of Ser. No. 196,822, May 19, 1988, abandoned, which is a continuation of Ser. No. 920,672, Oct. 20, 1986, abandoned. This application Sep. 22, 1989, Ser. No. 412,545

Claims priority, application Australia, Oct. 25, 1985, PH3095; May 8, 1986, PH5813

Int. Cl.[5] A61K *31/34, 31/19*

U.S. Cl. 514—474 8 Claims

1. A dry composition useful for its antibacterial activity when dissolved in water, said composition consisting essentially of the following ingredients in amounts that will deliver the specified number of grams per 100 ml when dissolved in water:

(a) Ascorbic acid or pharmaceutically-acceptable salts thereof	0.001–1.0
(b) Malic acid or pharmaceutically acceptable salts thereof	0.01–1.0
(c) At least one of sodium saccharin and calcium saccharin	up to 0.1
(d) Sodium benzoate or benzoic acid	0.001–0.34

4,996,233

METHOD OF REDUCING PORPHYRIN TOXICITY USING FATTY ACIDS

David F. Horrobin, Guildford, England, assignor to Efamol Limited, Guildford, England

Continuation of Ser. No. 903,469, Sep. 4, 1986, abandoned. This application Feb. 14, 1990, Ser. No. 480,375

Claims priority, application United Kingdom, Sep. 13, 1985, 8522670

Int. Cl.[5] A61K *31/20, 31/40*

U.S. Cl. 514—560 2 Claims

1. A method of reducing the skin-sensitizing effects of porphyrins administered therapeutically, said method comprising systemically administering to a person to whom porphyrins are being therapeutically administered from 1 mg to 500 g of a polyunsaturated fatty acid of the n-6 series or its metabolites and an essential fatty acid of the n-3 series or its metabolites, alone or in an acceptable pharmaceutical diluent or carrier.

4,996,234

HMG-COA REDUCTASE INHIBITORS

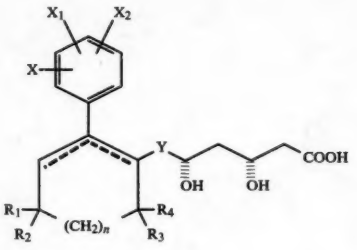
John R. Regan, Princeton, N.J., and Kent W. Neuenschwander, Ambler, Pa., assignors to Rhone-Poulenc Rorer Pharmaceuticals Inc., Fort Washington, Pa.

Division of Ser. No. 328,836, Feb. 13, 1990, Pat. No. 4,900,754, which is a continuation-in-part of Ser. No. 135,805, Dec. 21, 1987, Pat. No. 4,863,957. This application Dec. 5, 1989, Ser. No. 446,358

Int. Cl.[5] A61K *31/19, 31/20;* C07C *62/30, 62/04*

U.S. Cl. 514—563 8 Claims

1. Hydroxy acids and pharmaceutically acceptable salts thereof of a compound of the formula



wherein

Y is

—CHR—,

—CHRCHR—,

—CHRCHRCHR—, or

—RC=CR—;

X, X_1 and X_2 are independently:

R,

NO_2,

NH(CO)R,

$N(R)_2$,

$S(O)_mR$,

F,

Cl or

Br;

R_1 is OR;

R_2 is R;

R_3 and R_4 are independently:

H or

lower alkyl;

R is

H or

lower alkyl;

n is 0–2; and

m is 0–2.

4,996,235

3,4-DIPHENYLBUTANAMINES

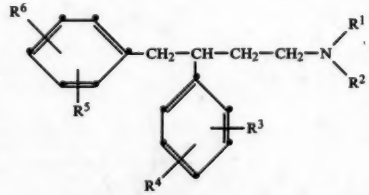
David W. Robertson, Greenwood, and David T. Wong, Indianapolis, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Nov. 25, 1987, Ser. No. 125,512

Int. Cl.[5] A61K *31/135;* C07C *211/00*

U.S. Cl. 514—649 32 Claims

1. A compound of the formula



wherein:

R^1 and R^2 are each independently hydrogen or methyl;

R^3, R^4, R^5, and R^6 are each independently hydrogen, halo, trifluoromethyl, C_1–C_4 alkyl, $_1$–C_3 alkoxy or C_2–C_4 alkenyl; or

a pharmaceutically acceptable acid addition salt thereof.

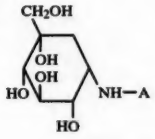
4,996,236

THERAPEUTIC COMPOSITION FOR HEPATIC ENCEPHALOPATHY

Nobuto Nakamura; Hiroshi Satoh, both of Osaka; Matsuo, Kyoto, all of Japan, and Misael U. Esquivel, Tlalpan, Mexico, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed May 15, 1989, Ser. No. 351,462
Claims priority, application Japan, Jun. 22, 1988, 63-153845
Int. Cl.[5] A61K *31/13, 31/44, 31/38*
U.S. Cl. 514—659 2 Claims

1. A method for the treatment of hyperammonemia which comprises administering to a subject in need thereof an effective hyperammonemia-reducing amount of a valiolamine compound of the formula



wherein A means an acyclic hydrocarbon group of 1 to 10 carbon atoms which may optionally be substituted by hydroxy, phenoxy, thienyl, furyl, pyridyl, cyclohexyl or optionally substituted phenyl; a 5- or 6-membered cyclic hydrocarbon group which may optionally be substituted by hydroxy, hydroxymethyl, methyl, or amino; or a saccharide residue or a pharmaceutically acceptable salt thereof.

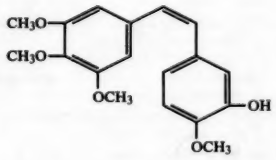
4,996,237

COMBRETASTATIN A-4

George R. Pettit, Paradise Valley, and Sheo B. Singh, Tempe, both of, assignors to Arizona Board of Regents, Tempe, Ariz.

Continuation-in-part of Ser. No. 590, Jan. 6, 1987. This application Feb. 22, 1988, Ser. No. 158,866
Int. Cl.[5] A61K *31/075*
U.S. Cl. 514—720 3 Claims

1. A compound denominated combretastatin A-4 and for inhibiting tubulin polymerization having the structural formula:



4,996,238

METHOD OF TREATING DIAPER RASH

Peter Matravers, San Marino, Calif., assignor to Neutrogena Corporation, Los Angeles, Calif.

Division of Ser. No. 245,660, Sep. 16, 1988. This application Jun. 25, 1990, Ser. No. 543,100
Int. Cl.[5] A61K *31/00*
U.S. Cl. 514—865 1 Claim

1. A method of treating an infant with an area of diaper rash comprising applying to said area of diaper rash a preparation containing, in weight percent, from about 1 to 10 percent C_{18}–C_{36} aliphatic wax, from about 1 to about 20 percent anhydrous hydrophobic silicone, and a pharmacologically acceptable carrier, said wax and said silicone being dispersed in said carrier.

4,996,239

WATER RESISTANT CREAM CONDITIONER

Peter Matravers, San Marino, Calif., assignor to Neutrogena Corporation, Los Angeles, Calif.

Filed Sep. 16, 1988, Ser. No. 245,660
Int. Cl.[5] A61K *7/48, 9/07*
U.S. Cl. 514—873 4 Claims

1. An anhydrous topical composition of matter for water proofing mammalian skin containing a pharmacologically acceptable carrier selected from the group consisting of mineral oil, vegetable oil, and an aliphatic/branched chain ester and, in weight percent, from about 1 to about 10 percent C_{18}–C_{36} saturated synthetic fatty acid wax and from about 2 to about 20 percent anhydrous hydrophobic silicone, said wax and said silicone being dispersed in said carrier.

4,996,240

SYNTHETIC POLYMER PROPELLANT SYSTEMS

Lloyd I. Osipow, 2 Fifth Ave., New York, N.Y. 10011; Dorothea C. Marra, 107 Fernwood Rd., Summit, N.J. 07901, and J. George Spitzer, 44 Coconut Row, Palm Beach, Fla. 33480

Division of Ser. No. 867,580, May 28, 1986, abandoned. This application Aug. 8, 1988, Ser. No. 230,680
Int. Cl.[5] C08J *9/00*
U.S. Cl. 521—78 7 Claims

1. Polymer-propellant compositions that form coherent foamed structures from which aqueous solutions can be expressed consisting of about 5 to about 40% by weight of polymer selected from the group consisting of acrylic and methacrylic homopolymers and copolymers, from about 25 to 60% by weight of an aqueous solution containing from 0 to 60% alcohol, from about 25 to about 60% by weight of propellant based on the weight of the composition, where the useful range over which such coherent foam structures can form are extended at least to the range of 15 C. to 32 C., by employing a propellant mixture that contains a first propellant component in an amount from about 50 to 98% by weight of one or more propellants that are pool solvents for the polymer and have low vapor pressures in the range of 10 to 35 psig at 20 C. and which are selected from the group consisting of n-butane, isobutane and 1,2 dichlorotetrafluoroethane, and at least 2% by weight of a second propellant component which comprises one or more propellants that are good solvents for the polymer and which are selected from the group consisting of dimethyl ether and 1-chloro-1,1-difluoroethane and any remainder being a third liquid propellant component in an amount required to make 100% by weight of propellant mixture, 0 to 3% by weight of an insoluble fine particle solid that does not pack, the total amount of alcohol and/or fine particle solid being in an amount sufficient to enable a coherent foam structure to form upon expulsion of the polymer-propellant composition.

4,996,241

POLYISOCYANURATE RIGID FOAMS

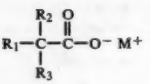
Berend Eling, Wezembeek-Oppem, and Colin R. Tweedale, Overijse, both of Belgium, assignors to Imperial Chemical Industries PLC, Millbank, London, England

Continuation of Ser. No. 196,158, May 19, 1988, abandoned. This application Oct. 17, 1989, Ser. No. 414,824
Claims priority, application United Kingdom, May 26, 1987, 8712363
Int. Cl.[5] C08G *18/18, 18/22, 18/76*
U.S. Cl. 521—107 3 Claims

1. In paragraph (b) delete the formula

"$R^1R^2R^3C—CO_2M$"

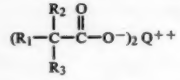
and substitute therefore the following structure:



in paragraph (c) delete the structure:

"$[R^1R^2R^3C—CO_2]_2—Q$"

and substitute therefore the structure:



4,996,242

POLYURETHANE FOAMS MANUFACTURED WITH MIXED GAS/LIQUID BLOWING AGENTS

Chung Y. Lin, Orange, Conn., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 22, 1989, Ser. No. 355,539

Int. Cl.[5] C08K *5/00*

U.S. Cl. 521—131 **11 Claims**

1. A mixed blowing agent comprising: (1) from about 2 to about 25 percent by weight of at least one halocarbon blowing agent having a boiling point below about 10° C.; (2) from about 30 to about 90 percent by weight of at least one halocarbon blowing agent having a boiling point of from about 20° C. to about 35° C.; and (3) from about 8 to about 45 percent by weight of an inert organic liquid having a boiling point from about 35° C. to about 125° C., and provided at least one of said components (1), (2), or (3) contains at least one hydrogen atom.

4,996,243

CURABLE ACRYLAMIDO OLIGOMER COMPOSITIONS WITH INITIATOR, AND CURED PRODUCTS

Jerald K. Rasmussen, Stillwater; Steven M. Heilmann, Afton, both of Minn., and Frederick J. Palensky, Tokyo, Japan, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 233,218, Aug. 17, 1988, Pat. No. 4,914,223, which is a continuation-in-part of Ser. No. 316,234, Oct. 29, 1981, Pat. No. 4,777,276. This application Jan. 16, 1990, Ser. No. 465,041

Int. Cl.[5] C08F *2/50, 20/58, 20/60*

U.S. Cl. 522—99 **11 Claims**

1. A composition of matter comprising

(a) an acrylamido- or methacrylamido-acyl oligomer having the general formula:

$$A_p(HX)_{n-p}R$$

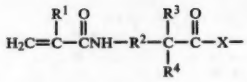
wherein

R is an organic group having a valence of n and is the residue of a nucleophilic group-substituted oligomer, $(HX)_nR$, said oligomer being selected from the group consisting of polyoxyalkylene, polyalkyleneimine, organic polyester, polyacrylic acid ester, polysiloxane, and polyolefin oligomers having one or more hydroxyl, amino, or thiol groups and having a molecular weight of 200 to 20,000;

n is a positive number of at least one and represents the valence of R;

p is a positive number in the range of 1 to n;

A is an acrylamido-acyl group or a methacrylamido-acyl group having the formula



wherein

F^1 is hydrogen, chlorine, or a methyl group;

R^2 is a single bond or a methylene or ethylene group that can be substituted by an alkyl group having 1 to 6 atoms or phenyl;

R^3 and R^4 are independently hydrogen, an alkyl or cycloalkyl group having 1 to 12 carbon atoms, phenyl or alkyl-substituted phenyl having 6 to 12 carbon atoms, or R^3 and R^4 taken together with the carbon atom to which they are attached form a 5- to 12-membered carbocyclic ring; and

X is

—O—, or —S—,

in which R^5 is (a) hydrogen, (b) a group selected from an alkyl or cycloalkyl group having 1 to 12 carbon atoms optionally substituted by a cyano, hydroxyl, or an alkoxy group having 1 to 4 carbon atoms, or A;

with the proviso that when R^5 is an alkyl or cycloalkyl group, then at least one of R^3 and R^4 is hydrogen, and

(b) an amount of a thermally or photochemically activatable free radical generator sufficient to initiate polymerization of said composition.

4,996,244

ENHANCING COLOR STABILITY TO STERILIZING RADIATION OF POLYMER COMPOSITIONS

Roger W. Avakian, Parkersburg, W. Va., assignor to General Electric Company, Pittsfield, Mass.

Continuation of Ser. No. 136,608, Dec. 22, 1987, Pat. No. 4,880,854, which is a division of Ser. No. 769,277, Aug. 26, 1985, abandoned, which is a continuation-in-part of Ser. No. 579,103, Feb. 10, 1984, abandoned. This application Oct. 20, 1989, Ser. No. 425,618

Int. Cl.[5] C08K *5/3492*

U.S. Cl. 523—136 **1 Claim**

1. A method for sterilizing an aromatic carbonate polymer, said method comprising:

(i) imparting enhanced stability against sterilizing radiation to an aromatic carbonate polymer by admixing an effective amount of an ester compound therewith effective to inhibit yellowing upon exposure to sterilizing radiation, said ester compound formed from esterifying 3,5di-tert-butyl-4-hydroxyhydrocinnamic acid triester with 1,3,5-tris(2-hydroxy-ethyl)-s-triazine-2,4,6(1H,3H,5H)-trione.

4,996,245

ENHANCING COLOR STABILITY TO STERILIZING RADIATION OF POLYMER COMPOSITIONS

Linda H. Nelson, Evansville, Ind.; Roger W. Avakian, Brasschaat, Belgium, and Arnold Factor, Scotia, N.Y., assignors to General Electric Company, Pittsfield, Mass.

Continuation of Ser. No. 136,602, Dec. 22, 1987, Pat. No. 4,880,856, which is a division of Ser. No. 769,277, Aug. 26, 1985, abandoned, which is a continuation-in-part of Ser. No. 579,103, Feb. 10, 1984, abandoned. This application Oct. 20, 1989, Ser. No. 424,800

Int. Cl.[5] C08K *5/34*

U.S. Cl. 523—136 **1 Claim**

1. A method for sterilizing an aromatic carbonate polymer, said method comprising:

(i) imparting enhanced stability against sterilizing radiation

to an aromatic carbonate polymer by admixing an effective amount of a thiol compound effective therewith to inhibit yellowing upon exposure to sterilizing radiation, said thiol being selected from the group consisting of 2-mercaptobenzothiazol and 2,5-dimercapto-1,3,4-thiadiazone, and

(ii) exposing said aromatic carbonate polymer to sterilizing radiation.

4,996,246

ENHANCING COLOR STABILITY TO STERILIZING RADIATION OF POLYMER COMPOSITIONS

Linda H. Nelson, Evansville, Ind.; Roger W. Avakian, Frilinglei, Belgium, and Arnold Factor, Scotia, N.Y., assignors to General Electric Company, Pittsfield, Mass.

Continuation of Ser. No. 136,607, Dec. 22, 1987, Pat. No. 4,880,853, which is a division of Ser. No. 769,277, Aug. 26, 1985, abandoned, which is a continuation-in-part of Ser. No. 579,103, Feb. 16, 1984, abandoned. This application Oct. 20, 1989, Ser. No. 424,431

Int. Cl.[5] C08K *5/07*

U.S. Cl. 523—136 **1 Claim**

1. A method for sterilizing an aromatic carbonate polymer, said method comprising:

(i) imparting enhanced stability against sterilizing radiation to an aromatic carbonate polymer by admixing therewith an effective amount of a diketone compound effective to inhibit yellowing upon exposure to sterilizing radiation, said diketone being 2–4 pentanedione, and

(ii) exposing said aromatic carbonate polymer to sterilizing radiation.

4,996,247

ENHANCING COLOR STABILITY TO STERILIZING RADIATION OF POLYMER COMPOSITIONS

Linda H. Nelson, Evansville, Ind.; Roger W. Avakian, Brasschaat, Belgium, and Arnold Factor, Scotia, N.Y., assignors to General Electric Company, Pittsfield, Mass.

Continuation of Ser. No. 136,609, Dec. 22, 1987, Pat. No. 4,880,855, which is a division of Ser. No. 769,277, Aug. 26, 1985, abandoned, which is a continuation-in-part of Ser. No. 579,103, Feb. 10, 1984, abandoned. This application Oct. 20, 1989, Ser. No. 424,494

Int. Cl.[5] C08K *5/41*

U.S. Cl. 523—136 **1 Claim**

1. A method for sterilizing an aromatic carbonate polymer, said method comprising:

(i) imparting enhanced stability against sterilizing radiation to an aromatic carbonate polymer, comprising admixing an effective amount of a sulfone compound effective to inhibit yellowing upon exposure to sterilizing radiation said sulfone compound having the general formula $R^5—SO_2—R^6$, wherein R^5 and R^6 are the same or different, and R^5 and R^6 are selected from the group consisting of alkyl and aryl, and

(ii) exposing said aromatic carbonate polymer to sterilizing radiation.

4,996,248

ENHANCING COLOR STABILITY TO STERILIZING RADIATION OF POLYMER COMPOSITIONS

Linda H. Nelson, Evansville, Ind.; Roger W. Avakian, Brasschaat, Belgium, and Arnold Factor, Scotia, N.Y., assignors to General Electic Company, Pittsfield, Mass.

Continuation of Ser. No. 136,682, Dec. 22, 1987, Pat. No. 4,876,309, which is a division of Ser. No. 769,277, Aug. 26, 1985, abandoned, which is a continuation-in-part of Ser. No. 579,103, Feb. 10, 1984, abandoned. This application Oct. 20, 1989, Ser. No. 424,489

Int. Cl.[5] C08K *5/15*

U.S. Cl. 523—136 **1 Claim**

1. A method for sterilizing an aromatic carbonate polymer, said method comprising:

(i) imparting enhanced stability against sterilizing radiation to an aromatic carbonate polymer, comprising admixing an effective amount of a pyran compound effective to inhibit yellowing upon exposure to sterilizing radiation, said pyran compound is selected from the group consisting of hydrogenated pyran, non-hydrogenated pyran and substituted pyran wherein said substituted pyran has a substituent selected from the group consisting of alkyl, aryl, alkoxy and aryloxy, said substituent being positioned on any carbon atom in the pyran ring, and

(ii) exposing said aromatic carbonate polymer to sterilizing radiation.

4,996,249

METHOD TO IMPROVE FLOWABILITY OF RESIN COATED SAND

Calvin K. Johnson, Lockport; Richard C. Cooke, North Riverside, and Kwok-Tuen Tse, Chicago, all of Ill., assignors to Acme Resin Corporation, Westchester, Ill.

Filed Apr. 27, 1989, Ser. No. 344,132

Int. Cl.[5] C08K *5/524, 5/41, 5/06*; C08L *61/06*

U.S. Cl. 523—144 **34 Claims**

1. A process for improving the flowability of sand coated with a resin binder selected from the group consisting of alkaline phenolic resole resin binders and acid-curable resin binders which comprises incorporating in the mixture of sand and resin binder fluorosurfactant in an amount from about 0.01 percent to about 5 percent by weight of the resin binder

---

4,996,250

WATER-DILUTABLE AIR-DRYING PROTECTIVE COATING COMPOSITIONS

Rami-Raimund Awad; Gert Dworak; Bertram Zückert, and Walter Weger, all of Graz, Austria, assignors to Vianova Kunstharz, A.G., Werndorf, Australia

Filed Aug. 30, 1989, Ser. No. 400,787

Claims priority, application Austria, Aug. 31, 1988, 2131/88

Int. Cl.[5] C08L *67/08*

U.S. Cl. 523—500 **7 Claims**

1. Water-dilutable, air-drying protective coating compositions, comprising

(A) 4% to 95% by weight of a water-dilutable alkyd resin which contains from about 30% to 70% of oxidatively drying fatty acids and in which at least 80% of the free carboxyl groups corresponding to an acid number of 25 to 70 mg KOH/g originate from methacrylic acid units which are grafted onto at least part of the fatty acids, together with additional vinyl and/or (meth)acrylic monomers,

(B) 4% to 95% by weight of an aqueous polymer dispersion based on (meth)acrylic acid esters and/or butadiene and-/or styrene copolymers, and/or an aqueous polyurethane dispersion, and

(C) 1% to 30% by weight of an adduct of maleic acid anhydride with drying oils and/or with the unsaturated fatty acids which are synthesized from such oils and/or with synthetically produced esters of such fatty acids with diols

or polyols, the anhydride structures of the adduct being opened by water and/or a monoalcohol having from 1 to 10 carbon atoms, and which has an acid number of between about 40 and 280 mg KOH/g, the sum of the percentages of components (A) to (C) being 100.

4,996,251

POLYMERIC COMPOSITIONS AND THEIR PRODUCTION

David Farrar; Peter Flesher, both of West Yorkshire, and Peter R. B. Lawrence, London, all of Great Britain, assignors to Allied Colloids Ltd., Great Britain

Filed Feb. 9, 1989, Ser. No. 308,836

Claims priority, application United Kingdom, Feb. 10, 1988, 8803064; Feb. 10, 1988, 8803066

Int. Cl.[5] C02C *1/02, 5/10;* **C08F** *6/00, 20/56*

U.S. Cl. 524—17 **17 Claims**

1. A dispersion in non-aqueous liquid of particles of acrylamide polymer at least 50% by weight below 30 μm, wherein the water content of the dispersion is below 15 by weight based on the total weight of the dispersion and the dispersion also contains an amidase that is effective, when the dispersion is dispersed into water for 2 hours at 25° C., to reduce the content of acrylamide monomer.

4,996,252

INK COMPOSITION CONTAINING A BLEND OF A POLYESTER AND AN ACRYLIC POLYMER

Hieu D. Phan, Kingsport; Gary W. Carrier, Bristol; Rebecca R. Stockl, Kingsport; Frank J. Tortorici, Kingsport, and R. Gary Wulf, Kingsport, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 28, 1988, Ser. No. 225,520

Int. Cl.[5] C08L *67/02, 31/02, 77/00;* **C08K** *5/34*

U.S. Cl. 524—88 **30 Claims**

1. A polymer blend comprising:

(A) a linear water-dissipatible polymer having carbonyloxy linking groups in the linear molecular structure wherein up to 80% of the linking groups are carbonylamido linking groups, the polymer having an inherent viscosity of from about 0.1 to about 1.0 measured in a 60/40 parts by weight solution of phenol/tetrachloroethane at 25° C. and at a concentration of 0.25 gram of polymer in 100 mL of the solvent, the polymer containing substantially equimolar proportions of acid equivalents (100 mole %) to hydroxy and amino equivalents (100 mole %), the polymer comprising the reaction products of reactants selected from (1), (2), (3), and (4), or the ester forming or esteramide forming derivatives thereof, as follows, wherein all stated mole percentages are based on the total of all acid, hydroxyl and amino equivalents being equal to 200 mole %:

(1) at least one difunctional dicarboxylic acid;

(2) from about 4 to about 25 mole % of at least one difunctional sulfomonomer containing at least one metallic sulfonate group or nitrogen-contained non-metallic sulfonate group attached to an aromatic or cycloaliphatic nucleus wherein the functional groups are hydroxy, carboxyl or amino;

(3) at least one difunctional reactant selected from a glycol or a mixture of a glycol and diamine having two —NRH groups, the glycol containing two —CH_2—OH groups of which

(a) at least 15 mole % is a poly(ethylene glycol) having the structural formula

$$H—OCH_2—CH_2)_nOH,$$

being an integer of from 2 to about 20, or

(b) of which from about 0.1 to less than about 15 mole % is a poly(ethylene glycol) having the structural formula

$$H—OCH_2—CH_2)_nOH,$$

n being an integer of between 2 and about 500, and with the proviso that the mole % of said poly(ethylene glycol) within said range is inversely proportional to the quantity of n within said range; and

(4) from none to about 40 mole % of difunctional reactant selected from hydroxycarboxylic acids having one —$C(R)_2$—OH group, aminocarboxylic acids having one —NRH group, and amino—alcohols having one —$C(R)_2$—OH group and one —NRH group, or mixtures of said difunctional reactants;

wherein each R in the (3) and (4) reactants is a hydrogen atom or an alkyl group of 1 to 4 carbons; and

(B) an acrylic polymer in an amount of about 10 to 55 percent, based on the total weight of Components (A) and (B), said acrylic polymer being compatible with the water-dissipatable polyester at an acrylic polymer concentration of about 30 weight percent of the total acrylic/polyester polymer solids, which will not gel or have a significant increase in viscosity after being held at 120° F. (48.89° C.) for 24 hours or at room temperature for 14 days.

4,996,253

UV-LIGHT STABILIZED POLYOXYMETHYLENE MOLDING COMPOSITIONS

Bruce M. Mulholland, Union, Ky., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Filed Nov. 10, 1988, Ser. No. 269,408

Int. Cl.[5] C08K *5/3477, 5/3492*

U.S. Cl. 524—91 **20 Claims**

1. A molding composition exhibiting ultraviolet light stability comprising, based on the total weight of the composition:

(a) an oxymethylene copolymer;

(b) between about 0.015 to about 0.4 percent by weight of 2,4,6-triamino-sym-triazine;

(c) between about 0.25 to about 1.0 percent by weight of 2-(2-hydroxy-5-t-octylphenyl)-benzotriazole;

(d) between about 0.25 to about 1.0 percent by weight of 3,5-di-tert-butyl-4-hydroxyhydrocinnamic acid triester with 1,3,5-tris(2-hydroxyethyl)-s-triazine-2,4,6(1H, 3H, 5H)-trione; and

(e) between about 0.25 to about 1.0 percent by weight of bis(2,2,6,6-tetramethyl-4-piperdinyl)sebacate; wherein

(f) said composition exhibits a color difference, as calculated in CIELab units under illuminant "D-65" according to ASTM Standard D-2244, of less than about 3.5 when exposed to 1240.8 Kj/sq.m irradiation in a Xenon arc weatherometer operated according to SAE J1885.

4,996,254

PRODUCTION OF ELECTRONIC COATINGS BY SPIN COATING A PARTIALLY FLUORINATED POLYAMIC ACID COMPOSITION

Allan A. Eisenbraun, and Wesley C. Blocker, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Oct. 11, 1988, Ser. No. 255,609

Int. Cl.[5] C08G *69/32, 73/10, 73/12*

U.S. Cl. 524—104 **19 Claims**

1. A partially fluorinated polyamic acid composition especially adapted for use in spin coating wafers of semiconductive materials which composition comprises a solution of (i) a 2,2-bis(3,4-dicarboxyphenyl)hexafluoropropane dianhydride/2,2-bis[4-(aminophenoxy)phenyl]hexafluoropropane polyamic acid polymer having an inherent viscosity in the range of about 0.2 to about 1.5 dL/g (as measured in N-methylpyrrolidone at 25° C. at a concentration of 0.5 g/dL) in (ii) a solvent containing at least 10% by weight of a cycloaliphatic ketone or mixture of cycloaliphatic ketones, such that the solution (a) contains on a weight basis from about 5% to about 40% of such polyamic acid and (b) does not undergo precipitate formation during spin coating in an atmosphere of up to at least about 55% relative humidity.

4,996,255

FLAME RETARDANT, HALOGEN FREE AROMATIC POLYCARBONATE COPOLYMER BLENDS

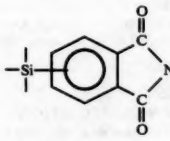
Gary C. Davis, Albany, and Larry N. Lewis, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 28, 1989, Ser. No. 399,096
Int. Cl.[5] C08K 5/54
U.S. Cl. 524—261 6 Claims

1. A flame retardant halogen-free aromatic polycarbonate comprising

(A) an aromatic polycarbonate copolymer consisting essentially of aromatic carbonate units condensed with 0.5 to 5 mole % of silarylene units based on the total moles of the aromatic carbonate units and silylarylene units selected from the class consisting of silylarylenecarbonyl units of the formula

silylaryleneimide units of the formula



and mixtures thereof and,

(B) an amount of a triarylsilicon material having the formula

$(R^2)_3SiY$

which is effective for imparting sufficient flame retardancy to provide a 1/16" or greater injection molded test sample capable of satisfying the V-O requirements of UL-94, where the unsatisfied valence bonds of the silicon atoms of the silylaryl carbonyl units and the silylaryleneimide units, can be satisfied by $C_{(1-13)}$ monovalent organic radicals, oxygen atoms or mixture thereof, R^2 is selected from $C_{(6-13)}$ monovalent aromatic organic radicals and Y is a member selected from $—C_2H_3$,—H,—$Si(R^2)_3$ and —$OSi(R^2)_3$.

4,996,256

FREE-FLOWING POLYARYLENE SULFIDES CRYSTALLIZING WITH DELAY

Hans-Detlef Heinz; Burkhard Köhler; Rolf-Volker Meyer, all of Krefeld; Klaus Reinking, Wermelskirchen, and Alexa Sommer, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed May 30, 1989, Ser. No. 358,065
Claims priority, application Fed. Rep. of Germany, Jun. 8, 1988, 3819479
Int. Cl.[5] C08K 5/32
U.S. Cl. 524—112 7 Claims

1. Composition comprising free-flowing arylene sulfide polymers which crystallize with delay, optionally additionally display improved resistance to UV radiation, and are prepared by mixing 75 to 99% by weight of one or more arylene sulfide polymers in the melt with 1 to 25% by weight of one or more aromatic mononitro compounds which do not contain any sulfonate salt groups and has a boiling point of at least 200° C.

4,996,257

SURFACE-TREATED POLYORGANOSILSESQUIOXANE FINE POWDER

Kenji Saito, and Hiroshi Kimura, both of Gunma, Japan, assignors to Toshiba Silicone Co., Ltd., Tokyo, Japan

Filed Apr. 18, 1989, Ser. No. 340,509
Claims priority, application Japan, Apr. 19, 1988, 63-94548
Int. Cl.[5] C08K 5/24
U.S. Cl. 524—262 3 Claims

1. A polyorganosilsesquioxane fine powder which is contacted with an organosilicon compound containing a quaternary ammonium group, so that the surface of the polyorganosilsesquioxane is covered with the organosilicon compound, wherein the organosilicon compound is represented by the formula (I) or (II):

$$[R^1R^2R^3N^+Q^1Si(R^4)_a(OR^5)_{3-a}]\ X^- \quad (I)$$

$$[R^1R^2R^3N^+Q^2NHQ^1Si(R^4)_a(OR^5)_{3-a}]\ X^- \quad (II)$$

wherein R^1 represents an alkyl group, a substituted or unsubstituted aralkyl group, or a group represented by $(C_nH_{2n}O)_mZ$ wherein Z represents a hydrogen atom or an alkyl group, symbol n is an integer of 2 to 4, and symbol m is an integer of 1 to 20; R^2 and R^3 each independently represents a hydrogen atom, an alkyl group or a hydroxyalkyl group; Q^1 and Q^2 each independently represents an alkylene group; R^4 represents an alkyl group or a phenyl group; R^5 represents an alkyl group having 1 to 4 carbon atoms; X represents an anion; and symbol a is an integer of 0 to 3.

4,996,258

HYDROFORMYLATED THERMAL OILS

Lawson G. Wideman, and Paul H. Sandstrom, both of Tallmadge, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sep. 5, 1989, Ser. No. 402,407
Int. Cl.[5] C08L 93/04
U.S. Cl. 524—274 18 Claims

1. A hydroformylated thermal oil prepared according to a process comprising reacting decarboxylated rosin acid having an acid number ranging from about 2 to about 62 with carbon monoxide and hydrogen under hydroformylation conditions in the presence of a hydroformylation catalyst and organic reaction solvent for a time sufficient until from about 0.1% to 5% of the decarboxylated rosin acid is functionalized.

4,996,259

PREPARATION OF AQUEOUS SYNTHETIC WAX DISPERSIONS

Gernot Koehler, Worms; Juergen Schmidt-Thuemmes, Ludwigshafen; Norbert Hasenbein, Dirmstein; Lothar Schlemmer, Maxdorf, and Wolfram Dietsche, Frankenthal, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 23, 1989, Ser. No. 397,879
Claims priority, application Fed. Rep. of Germany, Sep. 8, 1988, 3830535
Int. Cl.[5] C08J 3/02; C08L 23/00, 91/00
U.S. Cl. 524—276 6 Claims

1. A process for the preparation of an aqueous synthetic wax dispersion having a mean particle size of from 0.05 to 0.3 μm which contain, as an essential component of the solid substance, a partially or completely neutralized copolymer (I) which is composed of

(A) 75–95% of a C_2–C_4-olefin and

(B) 5–25% by weight of an unsaturated mono- or dicarboxylic acid or dicarboxylic anhydride or a mixture of these monomers, by neutralization and dispersion of the solid substance in an aqueous medium at above the melting

point of the copolymer (I), wherein the processes of neutralization and of dispersion are carried out in one extruder or in a plurality of extruders connected in series.

4,996,260

COMPOSITIONS OF NON-FILM FORMING POLYSULFIDE, LATEX EMULSION AND HYDROCARBON RESIN

Daniel O'Connell, Crystal Lake, Ill., assignor to Morton International, Inc., Chicago, Ill.

Filed Dec. 7, 1989, Ser. No. 447,281
Int. Cl.[5] C08K *5/05*
U.S. Cl. 524—381 **8 Claims**

1. A binder composition comprising emulsified and/or dispersed binder solid in an aqueous medium, said binder solids comprising:

(A) between about 10 and about 70 wt. percent relative to total binder solids of a film-forming latex emulsion,

(B) between about 10 and about 70 wt. percent relative to total binder solids of a non-film forming liquid polysulfide dispersion, said liquid polysulfide being —OH terminated and having a number average molecular weight of between about 100,000 and about 300,000, and

(C) between about 10 and about 50 percent relative to total binder solids of emulsified bydrocarbon resin, said hydrocarbon resin having a Ring and Ball softening point of between about 60° C. and about 150° C. a number average molecular weight of between about 350 and about 1200 and an iodine number of between about 10 and about 70,

said binder composition containing sufficient surfactant to maintain said binder solids emulsified and/or dispersed.

4,996,261

ANTI-FOULING CASTABLE POLYMERS AND ANTI-FOULING POLYURETHANES AND SIMILAR MATERIALS

Alexander Lebovits, Baltimore; William L. Yaeger, Queen-Anne; William B. Mercer, Annapolis, and Timothy L. Dapp, Bowie, all of Md., assignors to The United States of America as represented by the secretary of the Navy, Washington, D.C.

Continuation-in-part of Ser. No. 916,597, Oct. 8, 1986, abandoned. This application Sep. 1, 1988, Ser. No. 239,351
Int. Cl.[5] C08L *45/100*
U.S. Cl. 525—131 **16 Claims**

1. A process for preparing a structural antifouling polymeric composition consisting of:

(a) purifying an organotin compound selected from the group consisting of bis (tri-alkyltin) oxide, bis (tri-aryltin) oxide, bis (tri-cycloalkyltin) oxide, and tri-cycloalkyltin hydroxide by distillation or other suitable process to at least about 98% purity,

(b) synthesizing a copolymer by the copolymerization of monomers selected from the group consisting of esters of acrylic acid and esters of methacrylic acid with monomers selected from the group consisting of acrylic acid and methacrylic acid,

(c) reacting the organotin compound of (a) with the copolymer of (b) to form a polymeric tin-containing ester and choosing the proportions of (a) and (b) so that a small percentage of the carboxyl groups of (b) remain unreacted,

(d) mixing the reaction product of (c) with (1) isocyanates selected from the group consisting of multifunctional monomeric isocyanates, multifunctional monomeric thioisocyanates, and mixtures thereof, wherein multi means more than one and multifunctional means as having in the same molecule more than one functional group capable of reacting with more than one group selected from the group consisting of hydroxyl groups, amino groups and a combination thereof, and

(e) multifunctional compounds capable of reacting with isocyanates and thioisocyanates by means of active hydrogen containing groups, said active hydrogen containing groups being selected from the group consisting of hydroxyl, amine, carboxyl, hydrogen of water, hydrogen of atmospheric moisture and mixtures thereof, wherein multi means more than one and multifunctional means as having in the same molecule more than one functional group capable of reacting with more than one group selected from the group consisting of isocyanate groups, thioisocyanate groups and a combination thereof, and said mixing being done with an amount of reaction product of (c) to impart antifouling properties to the final composition.

4,996,262

POLYESTER REINFORCED RUBBER

James B. Pyke, Akron; Richard G. Bauer, Kent, and Donald J. Burlett, Wadsworth, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 27, 1989, Ser. No. 329,214
Int. Cl.[5] C08L *23/30, 15/00*
U.S. Cl. 525—177 **18 Claims**

1. A process for preparing a rubber composition having a high modulus which comprises reacting at least one epoxidized rubber containing double bonds and which is comprised of repeat units which are derived from conjugated diene monomers and/or nonconjugated diene monomers with from about 20 phr to about 100 phr of at least one polyester elastomer having a melting point of less than about 240° C. at a temperature which is within the range of about 140° C. to about 300° C.

4,996,263

HIGH MODULUS RUBBER COMPOSITION

James B. Pyke, Akron; Richard G. Bauer, Kent; Martin P. Cohen, and Pawan K. Handa, both of Akron, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Oct. 6, 1988, Ser. No. 253,839
Int. Cl.[5] C08L *77/00*
U.S. Cl. 525—178 **15 Claims**

1. A process for preparing a rubber composition having a high modulus which comprises reacting maleic anhydride with at least one polydiene rubber selected from the group consisting of polybutadiene, styrene-butadiene rubber, synthetic polyisoprene, natural rubber, isoprene-butadiene rubber, isoprene-butadiene-styrene rubber, nitrile rubber, and carboxylated nitrile rubber and at least one nylon wherein an electrocyclic reaction mechanism is utilized in reacting the maleic anhydride with the rubber.

4,996,264

THERMOPLASTIC AND ELASTOMERIC COMPOSITION

Mitsuyoshi Aonuma, Tokyo; Tatsunosuke Suzuki, Warabi; Satoru Isomura, and Koichi Nishimura, both of Yokohama, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed Aug. 23, 1988, Ser. No. 235,863
Claims priority, application Japan, Aug. 24, 1987, 62-209488
Int. Cl.[5] C08L *77/00*
U.S. Cl. 525—179 **6 Claims**

1. A thermoplastic and elastomeric composition comprising 25 to 60% by weight of a polyamide resin and 75 to 40% by weight of a rubber component; said rubber component comprising 20 to 80% by weight of a hydrogenated nitrile group-containing rubber and 80 to 20% by weight of an acrylic rubber, said rubber component being dispersed in the form of crosslinked particles in said polyamide resin; said hydrogenated nitrile group-containing rubber being a hydrogenated copolymer containing 10 to 60% by weight of a vinyl nitrile, 15 to 90% by weight of a conjugated diene and 0 to 75% by weight of a monomer copolymerizable with vinyl nitrile and said conjugated diene, said hydrogenated nitrile-group containing rubber having an iodine value of 120 or less; said

acrylic rubber being a copolymer of at least one acrylate selected from the group consisting of an alkyl acetate and an alkoxy-substituted alkyl acrylate with at least one compound selected from the group consisting of a nonconjugated diene, a conjugated diene, a dihydrodicyclopentadienyl group-containing (meth)acrylate, an epoxy group-containing ethylenically unsaturated compound, an active halogen-containing ethylenically unsaturated compound and a carboxyl group-containing ethylenically unsaturated compound.

4,996,265

PROCESS FOR PREPARATION OF MONODISPERSE POLYMER PARTICLES HAVING INCREASED PARTICLE SIZE

Masayoshi Okubo, Kobe, and Masami Tsujihiro, Osaka, both of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Jan. 25, 1989, Ser. No. 301,103
Claims priority, application Japan, Jan. 29, 1988, 63-17321
Int. Cl.[5] C08F *2/00*
U.S. Cl. 525—242 **18 Claims**

1. A process for the preparation of monodisperse polymer particles having an increased particle size, which comprises:

(i) preparing a solution or dispersion of a monomer, an oil-soluble polymerization initiator and a dispersion stabilizer in a mixture of (a) a water-miscible organic solvent capable of dissolving the monomer therein but incapable of dissolving a polymer of the monomer therein and (b) water;

(ii) dispersing a seed polymer having a swelling property to the monomer into said solution or dispersion to form an emulsion;

(iii) reducing the solubility of said monomer in said mixture of water-miscible organic solvent and water thereby causing said monomer and said polymerization initiator to be absorbed in said seed polymer to form swollen spherical particles having an increased particle size; and

(iv) selectively polymerizing the monomer absorbed in said seed polymer particles.

4,996,266

METHOD OF MAKING CONDENSED PHASE POLYMERS

William R. Bronn; Spencer F. Silver, and Eugene G. Joseph, all of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 107,262, Oct. 9, 1987, Pat. No. 4,857,615. This application Mar. 24, 1989, Ser. No. 328,533
Int. Cl.[5] C08F *4/00*
U.S. Cl. 525—271 **9 Claims**

1. A method of preparing a multi-arm copolymer having condensed phase copolymer arms, said method comprising the steps of

(A) preparing an elastomeric anionically terminated living copolymer having a condensed phase structure wherein polymer branches occur along a polymer backbone by reacting, under polymerization conditions, the following:

(a) hydrocarbyl lithium initiator;

(b) at least one anionically polymerizable compound; and

(c) a condensing agent having the general formula

$$CH_2{=}C(R')QY(R)_n(X)_m$$

wherein

Y is tetravalent Si, Ge, Sn, or Pb;

X is H,-OR", Cl, Br, or F, wherein R" is a monovalent lower alkyl group having from 1 to 6 carbon atoms;

R is hydrogen, a monovalent lower alkyl group having from 1 to 6 carbon atoms, or phenyl;

Q is phenylene;

R' is hydrogen, a monovalent lower alkyl group having from 1 to 6 carbon atoms, or phenyl;

m is an integer of 1, 2 or 3; and

n is an integer equal to 3−m; and

(B) contacting the resulting anionically terminated living copolymer with a multifunctional linking agent under reactive conditions thereby forming a multi-arm copolymer having condensed phase copolymer arms wherein the mole ratio of (a) to (c) is about (1+m):1 and the mole percentage of the condensing agent in each copolymer segment containing said condensing agent is in the range of about 0.01% to about 5%.

4,996,267

HEAT-CURABLE RESIN MIXTURE OF MONOCYANATE, POLYCYANATE AND REACTIVE THERMOPLASTIC

Dale Gerth, Ludwigshafen, Fed. Rep. of Germany; Peter Ittemann, Fort Mill, S.C., and Helmut Tesch, Birkenheide, Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jan. 30, 1989, Ser. No. 303,868
Int. Cl.[5] C08L *79/08, 81/06*
U.S. Cl. 525—423 **1 Claim**

1. A heat-curable resin mixture containing

(A) 100 parts by weight of a polyfunctional aromatic cyanic ester,

(B) from 2 to 100 parts by weight of a monofunctional aromatic cyanic ester,

(C) from 5 to 100 parts by weight of a hydroxyl terminated polysulfone or polyether sulfone thermoplastic having an average molecular weight Mn of from 5,000 to 20,000; polymer having a glass transition temperature above 100° C.,

(D) from 0 to 50 parts by weight of an optional bismaleimide, and

(E) from 0 to 50 parts by weight of an optional epoxy resin.

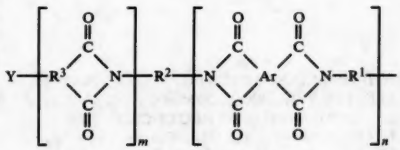
4,996,268

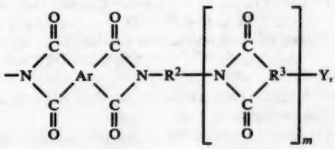
CARBINOL-CONTAINING POLYIMIDE OLIGOMERS TERMINATED WITH EPOXIDE-REACTIVE GROUPS

Jules E. Schoenberg, Scotch Plains, N.J., assignor to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

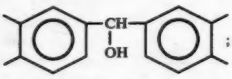
Division of Ser. No. 880,884, Jul. 1, 1986, Pat. No. 4,820,779. This application Feb. 17, 1989, Ser. No. 312,106
Int. Cl.[5] C08G *73/10, 73/14, 73/16*
U.S. Cl. 525—434 **7 Claims**

1. A carbinol-containing polyimide oligomer terminated with epoxide-reactive end groups, which has the structure





wherein Ar is



R^1 and R^2 are independently divalent organic radicals; R^3 is a trivalent organic radical; Y is an epoxide-reactive group selected from the group consisting of a phenol or thiol m is 0 and 1 and n is 0–10.

4,996,269

POLYESTER COMPOSITION WHICH IS PARTICULARLY SUITABLE FOR USE IN THERMOFORMING THIN WALLED ARTICLES

Donald E. Richeson, North Canton, and Judith A. Tweedie, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 13, 1987, Ser. No. 25,708

Int. Cl.[5] C08L *67/02*; B29C *51/00*

U.S. Cl. 525—444 **6 Claims**

1. A thermoformed, non-oriented, heat-set, thin walled article which consists of (1) from about 94 to about 99 weight percent polyethylene naphthalate, (2) from about 1 to about 6 weight percent of at least one polyester elastomer, and (3) an effective amount of a heat stabilizer.

4,996,270

VINYL ESTER RESINS

Bernhard Czauderna, Hirschberg; Juergen Nieberle, Wachenheim; Roland Peter, Ludwigshafen, and Dietmar Nissen, Heidelberg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 868,703, May 30, 1986, abandoned. This application Nov. 4, 1988, Ser. No. 267,714

Claims priority, application Fed. Rep. of Germany, Jun. 5, 1985, 3520113

Int. Cl.[5] C08F *283/10*

U.S. Cl. 525—531 **4 Claims**

1. A vinylester resin having unsaturated terminal groups produced by a process which comprises: reacting a polyphenol selected from the group consisting of 2,2,3,3,-tetrakis-(4-hydroxyphenyl)-butane, 2,2,4,4,-tetrakis-(4-hydroxyphenyl)-pentane and 2,2,5,5,-tetrakis-(4-hydroxyphenyl)-hexane with epichlorohydrin, and thereafter reacting the formed epoxy product with an unsaturated carboxylic acid.

4,996,271

METHOD OF MANUFACTURING HALOGENATED AROMATIC POLYSULFONE COMPOUNDS AND THE COMPOUNDS SO PRODUCED

Michael D. Guiver, Ottawa, and Oleh Kutowy, North Gower, both of Canada, assignors to National Research Council of Canada/Conseil de Recherches Canada, Ottawa, Canada

Filed Dec. 7, 1988, Ser. No. 281,041

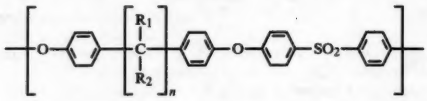
Claims priority, application Canada, Dec. 11, 1987, 554118

Int. Cl.[5] C08C *75/00*; C08F *283/00*; C08L *81/00*

U.S. Cl. 525—537 **9 Claims**

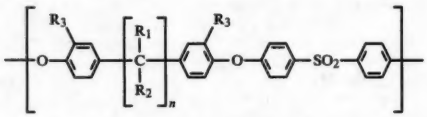
1. A method of manufacturing a halogenated aromatic polysulfone compound, comprising:

(a) forming a solution of the polysulfone compound with halogenated solvent, the polysulfone compound having repeating units of the general formula,



wherein n is one or zero, and when n is one R_1 and R_2 each represent alkyl or aryl groups,

(b) adding sufficient halogen to the solvent to halogenate the polysulfone compound to the desired degree so as to form a halogenated compound having repeating units of the general formula,



wherein R_1, R_2 and n are as previously defined and at least one R_3 per polymer chain is a halogen substitution of a hydrogen atom, and

(c) separating the halogenated polysulfone compound from the solvent.

4,996,272

RESIN USED FOR MAGNETIC RECORDING MEDIA AND A METHOD FOR THE PRODUCTION OF THE SAME

Takeshi Nakachi; Akio Hata, both of Shinnanyo, and Yoshihisa Watanabe, Uji, all of Japan, assignors to Sekisui Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 236,350, Aug. 22, 1988, Pat. No. 4,861,683, which is a continuation of Ser. No. 30,457, Mar. 25, 1987, abandoned. This application Jun. 26, 1989, Ser. No. 371,400

Int. Cl.[5] C08F *2/06*

U.S. Cl. 526—62 **4 Claims**

1. A method for the production of a resin used for magnetic recording media, comprising:

polymerizing an organic solvent solution containing vinyl chloride, vinyl monomers with hydroxyl groups and vinyl monomers with quaternary ammonium salt groups in a reacting apparatus to thereby precipitate a vinyl chloride copolymer, the interior surface of said reacting apparatus, which comes into contract with said organic solvent solution, being coated with a fluororesin, wherein

said organic solvent dissolves vinyl chloride, vinyl monomers with hydroxy groups, and vinyl monomers with quaternary ammonium salt therein, and separates the produced copolymer therefrom.

4,996,273

ANIONIC POLYMERIZATION CATALYST COMPOSITIONS

Adriaan A. Van Der Huizen, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed May 24, 1990, Ser. No. 527,922

Claims priority, application United Kingdom, Dec. 21, 1989, 8928955

Int. Cl.[5] C08F *4/52*

U.S. Cl. 526—177 **8 Claims**

1. Anionic polymerization processes comprising the steps of:

contacting at least one conjugated diene with a catalyst composition which contains an organolithium compound, a barium, strontium or calcium alcoholate or thiolate, and a trialkylaluminum compound having at least 13 carbon atoms per molecule, and

recovering a conjugated diene polymer or copolymer.

4,996,274

POLYCARBOXYLIC ACIDS WITH HIGHER THICKENING CAPACITY AND BETTER CLARITY

Chin C. Hsu, Avon Lake, Ohio, assignor to The B. F. Goodrich Company, Brecksville, Ohio

Filed Feb. 19, 1988, Ser. No. 157,685
Int. Cl.[5] C08F *2/00*
U.S. Cl. 526—208 7 Claims

1. A polymer which has viscosity of at least 15,000 cps in absence of salt when measured in a 2.0% by weight mucilage in water with pH adjusted to 7–8 with 18% NaOH solution, said polymer comprising at least 85% by weight of polymerized units of at least one carboxyl monomer selected from unsaturated carboxylic acids of 3 to 5 carbon atoms, salts thereof, and mixtures thereof, and up to 15% by weight of polymerized units of at least one copolymerizable comonomer, and said polymer is prepared in a mixed reaction medium consisting essentially of at least one organic solvent and at least one hydrocarbon solvent, wherein said organic solvent is selected from ketones, esters, ethers, and alcohols having solubility parameter in the range of 8 to 15 and wherein said hydrocarbon solvent is selected from aliphatic and cyclic aliphatic alkanes containing 4 to 12 carbon atoms and non-benzene aromatics of 7 to 9 carbon atoms.

4,996,275

FLUORINE CONTAINING POLYMERIC COMPOSITIONS USEFUL IN CONTACT LENSES

Edward J. Ellis, and Jeanne Y. Ellis, both of Lynnfield, Mass., assignors to Polymer Technology Corporation, Wilmington, Mass.

Continuation of Ser. No. 270,796, Nov. 10, 1988, abandoned, which is a continuation of Ser. No. 46,132, May 4, 1987, abandoned, which is a continuation of Ser. No. 786,846, Oct. 11, 1985, Pat. No. 4,686,267. This application Dec. 12, 1989, Ser. No. 449,565
The portion of the term of this patent subsequent to Aug. 11, 2004, has been disclaimed.
Int. Cl.[5] C08F *30/08*
U.S. Cl. 526—245 7 Claims

1. A contact lens formed from polymerization of a monomeric mixture of bis(1,1,1,3,3,3-hexafluoro-2-propyl) itaconate, bis(methacryloxypropyl)1,1,3,3-tetrakis (trimethyl siloxy) disiloxane, tris(trimethylsiloxy) silylpropyl methacrylate, n-vinyl pryyolidone, methacrylic acid and a cross linking agent.

4,996,276

PROCESS FOR THE POLYMERIZATION OF PENTABROMOBENZYLESTER MONOACRYLATE

Theodor-Morel Fishler, 29 Oren Street, Haifa; Michael Peled, 17 Hatzav Street, Beer Sheva, and Leonard M. Shorr, 39 Palmach Street, Haifa, all of Israel

Filed Jun. 1, 1989, Ser. No. 359,997
Claims priority, application Israel, Jun. 2, 1988, 86605
Int. Cl.[5] C08F *18/20*
U.S. Cl. 526—2927.5 5 Claims

1. A process for the thermal bulk homopolymerization of pentabromobenzylester monoacrylate and the co-polymerization of pentabromobenzylester monoacrylate with compatible monomer(s), wherein the monomer(s) is (are) brought to melting conditions and heated to a temperature comprised between 120° C. and 290° C., for a period of time comprised between about 0.5 minutes and about 30 minutes.

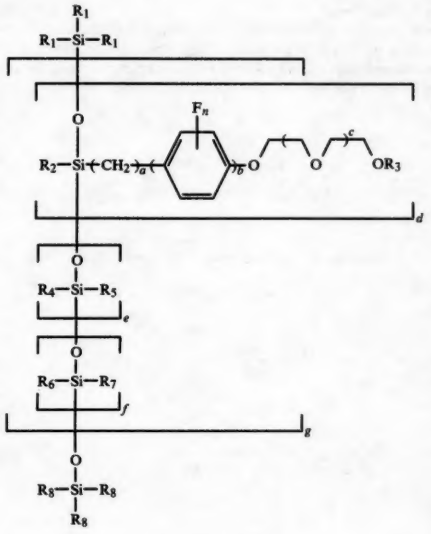
4,996,277

NOVEL OLIGOETHYLENE OXIDE-CONTAINING ALKENES, ALKOXYSILANES, AND POLYSILOXANES

Jerald S. Bradshaw, 1616 Oaklane, Provo, Utah 84604; Milton L. Lee, 2400 N. 180 W., Pleasant Grove, Utah 84062, and Karin E. Markides, 794 S. 700 East, Springville, Utah 84663

Filed Feb. 8, 1988, Ser. No. 153,369
Int. Cl.[5] C08G *77/06*
U.S. Cl. 528—15 15 Claims

1. A compound of formula



wherein;

a is an integer from 0 to about 14; b is an integer of 1 or 2; c is an integer from 0 to about 10; d is an integer from 1 to about 100; e is an integer from 0 to about 100. f is an integer from 0 to about 12; and g is an integer from 1 to about 50;

R_1 and R_8 are selected from the group consisting of lower alkyl, lower alkenyl, lowerhaloalkyl and phenyl;

R_3 is hydrogen, alkyl of 1–22 carbon atoms; fluorinated alkyl of 1–22 carbon atoms; aryl selected from the group consisting of phenyl, naphthyl, biphenyl, pyridyl, furyl, thienyl and pyrryl and the lower alkyl, lower alkoxy, cyano, nitro, fluoro, chloro, bromo, lower alkylsulfonyl, lower alkyl carboxyl, lower alkylamindo, lower dialkylamino and lower perhaloalkyl substituents thereof; or lower aralkyl;

R_2, R_4, R_5 and R_6 are members selected from the group consisting of hydrogen, lower alkyl, phenyl, phenyl substituted loweralkyl, loweralkyl substituted phenyl, lower alkoxy substituted phenyl and halosubstituted phenyl;

R_7 is a member selected from the group consisting of alkyl of 1 to 12 carbon atoms, alkenyl of 2 to 8 carbon atoms, phenyl substituted loweralkyl and loweralkyl substituted phenyl;

F is hydrogen, alkyl of 1 to 10 carbon atoms, fluorinated alkyl of 1 to 10 carbon atoms, alkoxy of 1 to 10 carbon atoms, phenyl, thienyl, furyl, pyridyl, pyrryl, nitro, cyano, chloro, bromo, fluoro, or $-(OCH_2CH_2)_m-OR_9$ wherein m and n are integers of 1 to 4 and R_9 is methyl or ethyl.

4,996,278

NOVEL POLYIMIDESILOXANES AND METHODS FOR THEIR PREPARATION AND USE BASED ON DIAMINES WITH PENDANT FLUORINE GROUPS

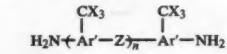
Chung J. Lee, E. Amherst, N.Y., assignor to Occidental Chemical Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 153,898, Feb. 9, 1988, Pat. No. 4,853,452, Ser. No. 154,168, Feb. 9, 1988, Pat. No. 4,829,131, Ser. No. 205,412, Jun. 10, 1988, Pat. No. 4,956,437, Ser. No. 270,920, Nov. 14, 1988, Pat. No. 4,957,993, and Ser. No. 239,372, Sep. 1, 1988, Pat. No. 4,973,645, which is a continuation-in-part of Ser. No. 32,272, Mar. 31, 1987, abandoned. This application Feb. 7, 1989, Ser. No. 307,016

Int. Cl.[5] C08G 77/04

U.S. Cl. 528—26 71 Claims

1. In a substantially fully imidized polyimidesiloxane comprising the reaction product of an organic dianhydride, a difunctional siloxane monomer, and an organic amine, the improvement wherein the organic amine has the formula

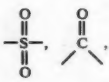


(I)

wherein

X is fluorine or combinations of fluorine with hydrogen

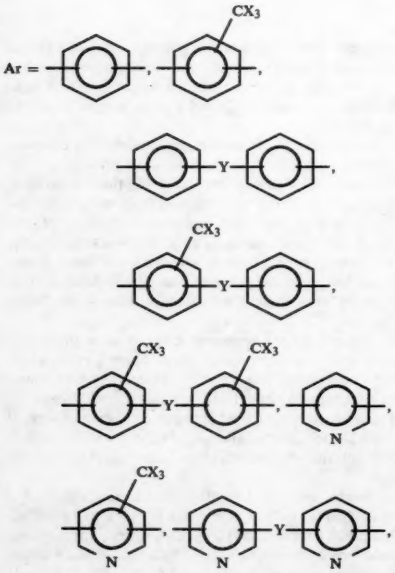
Z=—O—, —S—



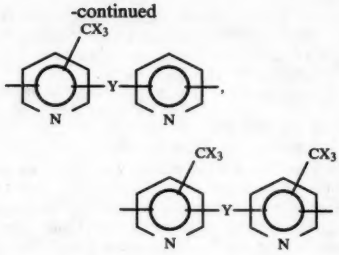
>C(CX$_3$)$_2$, — or —Y—Ar—Y—,

Ar' is an aromatic radical of 6 to 10 carbon atoms,

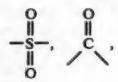
Ar =



-continued



Y=—O—, —S—,



>C(CX$_3$)$_2$, C(CH$_3$)$_2$, or —,

N=0 or 1.

4,996,279

DISSYMMETRIC POLYMER MATERIALS

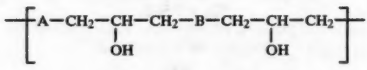
Kenneth C. Dewhirst, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Oct. 7, 1988, Ser. No. 255,086

Int. Cl.[5] C08G 59/00, 59/02

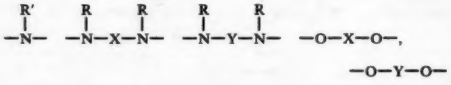
U.S. Cl. 528—27 30 Claims

1. A polymer composition consisting essentially of lightly crosslinked dissymmetric linear thermoplastic polymer molecules prepared from a diepoxide and at least one diphenol, primary amine or bis-secondary amine and having the repeating structures prior to crosslinking of the formula



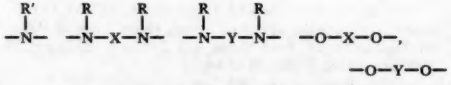
wherein said thermoplastic polymer molecules have substantially no epoxy functionality prior to crosslinking, and wherein

(a) A is selected from the group consisting of



and mixtures thereof, and

B is selected form the group consisting of



(b) R and R' are independently selected from the group consisting of unsubstituted or inertly substituted C_1–C_{20} aliphatic, cycloaliphatic or aralkyl groups, and each R' also is independently selected from the group of R plus any unsubstituted or inertly substituted aryl groups;

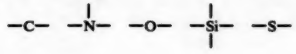
(c) said repeating structures are lightly crosslinked such that between 1 and 50 of said repeating structures per 100 total repeating structures are crosslinked to repeating structures of other molecules;

(d) X and Y each independently is a segment comprising stiff

units (SU and SU', respectively) and flexible units (FU and FU', respectively), which stiff units and flexible units are interconnected, with the proviso that in about 50% or more of the segments X plus Y the stiff and flexible units are interconnected to form a segment which is dissymmetric along its linear chain axis;

(e) said stiff units, SU and SU', are independently selected from the groups consisting of unsubstituted and substituted aryl, and non-interfering heterocyclic rings;

(f) said flexible units, FU and FU', are independently selected form the group of



and

(g) the ratio of the number of stiff units to flexible units in said X segment (SU/FU) is equal to or greater than the ratio of the number of stiff units to flexible units in said Y segment (SU'/FU').

4,996,280

POLYORGANOSILOXANE COMPOUNDS WITH AMINO GROUP

Takahiro Saho; Yoshinori Akutsu; Takaharu Nakano, and Nobumasa Ohtake, all of Yokohama, Japan, assignors to Chisso Corporation, Japan

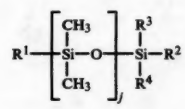
Filed Aug. 1, 1989, Ser. No. 387,768

Claims priority, application Japan, Aug. 1, 1988, 63-192317

Int. Cl.[5] C08G *77/06*

U.S. Cl. 528—15 **10 Claims**

1. A polyorganosiloxane compound represented by the following general formula (I):

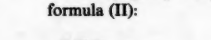


(I)

in which

j is an integer from 2 to 2,000;

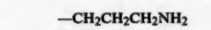
R^1 is a pentafluorophenyl group or a linear or branched fluoroalkyl group as represented by the following general formula (II):



(II)

(wherein a is an integer from 3 to 18 and b is 0 or 2a;

R^2 is a substituent as represented by formula (III):



(III)

; and

R^3 and R^4 are independently each an alkyl group having from 1 to 4 carbon atoms or a phenyl group.

4,996,281

POLYMERS CONTAINING AMIDE MOIETIES AND A PROCESS FOR THEIR PREPARATION

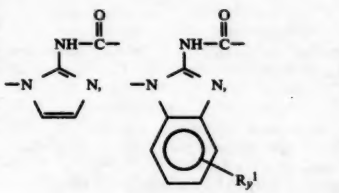
Ying H. So, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

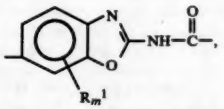
Filed Sep. 29, 1989, Ser. No. 414,847

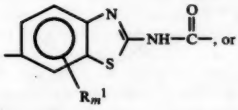
Int. Cl.[5] C08G *18/60*

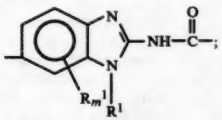
U.S. Cl. 528—73 **15 Claims**

1. A polymer comprising a backbone portion containing at least one of the following units:









wherein each R^1 is a C_{1-4} alkyl moiety, y is a whole number from 1 to 4, and m is a whole number from 1 to 3.

4,996,282

CATIONICALLY CURABLE POLYURETHANE COMPOSITIONS HAVING VINYL ETHER FUNCTIONALITY

Gerry K. Noren, Hoffman Estates; John J. Krajewski, Wheeling, and Edward J. Murphy, Mt. Prospect, all of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 172,430, Mar. 24, 1988, abandoned, and Ser. No. 251,782, Oct. 3, 1988, abandoned. This application Sep. 8, 1989, Ser. No. 404,652

Int. Cl.[5] C08G *18/04*

U.S. Cl. 528—75 **38 Claims**

1. A cationically curable polyurethane composition comprising the reaction product of an organic polyisocyanate with a transvinylation polyhydric alcohol mixture containing hydroxy groups that is the transvinylation reaction product of (1) at least one vinyl ether and (2) at least one polyhydric alcohol having an average of more than 2 hydroxy groups per molecule, with the polyisocyanate consuming substantially all of the available hydroxy groups of the transvinylation mixture.

4,996,283

REACTIVE HOT MELT COMPOSITION

Alberto Greco, Dresano; Sergio Giordano, Peschiera Borromeo; Enrico Pozzi, Milan, and Patrizia Blasioli, Biassono, all of Italy, assignors to Enichem Synthesis S.p.A., Palermo and Boston S.p.A., Milan, both of, Italy

Filed Nov. 6, 1989, Ser. No. 431,911

Claims priority, application Italy, Nov. 18, 1988, 22653 A/88

Int. Cl.[5] C08G *18/44*

U.S. Cl. 528—80 **14 Claims**

1. A hot melt composition cross-linkable by the action of environmental humidity or heat to form cross-linked products having high degradation resistance, comprising the product of the reaction between:

(A) an aliphatic or aromatic diisocyanate, and

(B) a mixture of the following diols:

(1) a crystalline polycarbonate diol having a number-average molecular weight (Mn) of between 1,000 and 10,000, a glass transition temperature (Tg) of less than −50° C., and a ΔH of crystallization equal to or greater than 80 J/g, prepared by a transesterification reaction between an organic carbonate and one or more HO—$(CH_2)_x$—OH aliphatic diols, where x is a whole number equal to or greater than 8,

(2) an elastomeric polycarbonate diol or an elastomeric polycarbonate copolyester diol, having a number-average molecular weight (Mn) of between 1,500 and 6,000 and a glass transition temperature of between −35° and −60° C., said elastomeric polycarbonate diol being prepared by a transesterification reaction between an organic carbonate and one or more HO—$(CH_2)_y$—OH aliphatic diols, where y is a whole number less than 8, or said elastomeric polycarbonate copolyester diol being prepared by a transesterification reaction between an organic carbonate, one or more HO—$(CH_2)_y$—OH aliphatic diols, where y has the aforesaid meaning, and a lactone or an aliphatic polyester diol oligomer, and

(3) a vitreous polycarbonate diol or a vitreous polycarbonate copolyester diol having a number-average molecular weight (Mn) of between 600 and 6,000 and a glass transition temperature (Tg) of between −10° and 50° C., said vitreous polycarbonate diol being prepared by a transesterification reaction between an organic carbonate and a cycloaliphatic diol or mixture of cycloaliphatic and aliphatic diols, said vitreous polycarbonate copolyester diol being prepared by reaction between an organic carbonate, a cycloaliphatic diol or mixture of cycloaliphatic and aliphatic diols, and an aromatic polyester diol oligomer,

wherein for each part by weight of the sum of (1), (2) and (3), component (1) is present in a quantity of between 30 and 70 parts by weight, component (2) is present in a quantity of at least 20 parts by weight, and component (3) is present in a quantity of between 0 and 50 parts by weight, and the ratio of NCO groups of component (A) to OH groups of component (B) exceeds 1.

4,996,284

NOVEL EPOXY SULFONAMIDE-BASED RESINS, A PROCESS FOR THEIR PREPARATION AND USE OF SAME

Leo X. Mallavarapu, 32 Tamarack La., Pomona, N.Y. 10970

Filed Apr. 24, 1989, Ser. No. 342,170

Int. Cl.[5] C08G *59/44*

U.S. Cl. 528—92 **6 Claims**

1. A process for the preparation of a thermoplastic sulfonamide-based epoxy resinous composition, comprising the step of:

reacting a sulfonamide compound with a resinous composition, at a temperature of, at least, approximately 140° C. containing a plurality of epoxide groups in the presence of a Lewis acid.

4,996,285

IMIDE/EPOXY THERMOSETTING COMPOSITIONS

Rene Arpin, Lyon, France, assignor to Rhone-Poulenc Chimie, Courbevoie, France

Continuation of Ser. No. 141,718, Jan. 11, 1988, abandoned. This application Oct. 11, 1989, Ser. No. 420,723

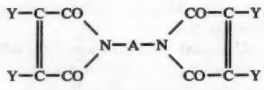
Claims priority, application France, Jan. 9, 1987, 87 00299

Int. Cl.[5] C08G *59/44, 73/12*

U.S. Cl. 528—117 **13 Claims**

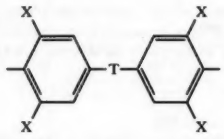
1. A thermosetting composition of matter comprising a copolymerizate of:

(a) an N,N'-bisimide of the formula:

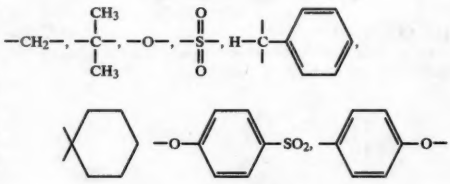


in which Y is H, CH_3 or Cl;

A is cyclohexylene, phenylene, 4-methyl-1,3-phenylene, 2-methyl-1,3-phenylene, 5-methyl-1,3-phenylene, 2,5-diethyl-3-methyl-1,4-phenylene, or a radical of the formula:



in which T is a single valence bond or a group:



and the symbols X, which are identical or different, are each a hydrogen atom or a methyl, ethyl or isopropyl radical;

(b) a diprimary diamine of the formula:

$$H_2N—B—NH_2 \quad \text{(II)}$$

in which the symbol B is one of the divalent radicals represented above by the symbol A, with the proviso that the symbols A and B present in the same polymer may be identical or different; and

(c) a chlorinated or brominated epoxy resin having an epoxy equivalent weight ranging from 100 to 500 said resin being taken by itself or mixed with an unchlorinated or unbrominated epoxy resin having an epoxy equivalent weight ranging from 100 to 500, with the proviso that the quantity of chlorine or of bromine contributed by the epoxy resin or the mixture of epoxy resin, expressed as the weight percentage of elemental chlorine or elemental bromine relative to the combined mixture of bisimide, diamine and epoxy resin, is not more than 6%, wherein said copolymerizate is the reaction product formed in a continuous process at a temperature ranging from about 90° C. to about 200° C. by introducing bisimide (a) into a mixer with an extruder screw, separately introducing diamine (b) into the mixer downstream from the introduction of bisimide (a), and separately introducing epoxy resin (c) into the mixer downstream from the introduction of diamine (b).

4,996,286

TRIHYDRAZIDE LATENT CURING AGENT FOR EPOXY RESINS

Kiyomiki Hirai, Kawasaki; Koji Takeuchi, Yokohama; Nobuo Ito, Oiso, and Masahiro Abe, Kawasaki, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed Feb. 15, 1985, Ser. No. 702,307

Claims priority, application Japan, Feb. 25, 1984, 59-34867

The portion of the term of the term of this patent subsequent to Jul. 23, 2002, has been disclaimed.

Int. Cl.[5] C07C *241/04*; C08G *59/44*

U.S. Cl. 528—123 5 Claims

1. A compound of the formula (I):

$$(NH_2NHCOCH_2CH_2)_2N(CH_2)_{11}CONHNH_2 \quad (I)$$

4,996,287

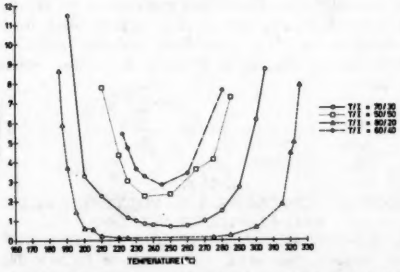
THERMOFORMABLE POLYARYLETHERKETONE SHEET

Joy S. Bloom, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

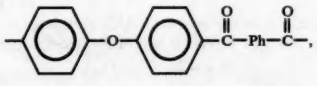
Filed Dec. 13, 1988, Ser. No. 283,695

Int. Cl.[5] C08G *8/02*

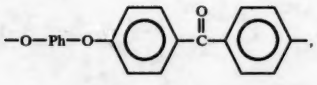
U.S. Cl. 528—125 20 Claims



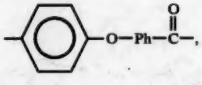
1. A polyaryletherketone sheet having a thickness of about 625 to 5000 micrometers, wherein the polyaryletherketone has a crystallinity of less than about 5% and consists essentially of repeating units selected from the group represented by the following formulas I, II, or III:



I



II



III

wherein Ph is either the 1,4-phenylene or the 1,3-phenylene group provided that the 1,4-phenylene to 1,3 phenylene isomer ratio is 70:30 to 0:100.

4,996,288

CYCLOBUTARENE KETOANHYDRIDE AND KETOCAG21XY MONOMERIC AND POLYMERIC COMPOSITIONS

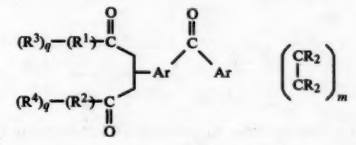
Kenneth J. Bruza, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 46,368, May 6, 1987. This application Feb. 8, 1989, Ser. No. 307,720

Int. Cl.[5] C07D *213/00, 213/62*; C08G *2/18, 16/00*

U.S. Cl. 528—220 14 Claims

1. A cyclobutarene of the formula:



wherein

R is separately and independently in each occurrence a hydrogen atom, an electron donating moiety or an electron withdrawing moiety;

Ar is an aryl moiety or an aryl moiety having atoms other than carbon atoms in its nucleus, which aryl moieties may be substituted with electron-withdrawing substituents or electron-donating substituents; with the proviso that the carbons of the cyclobutene ring connected to the R groups

are also bonded to adjacent carbon atoms on the same aromatic ring of Ar;

R^1 and R^2 are separately and independently in each occurrence a nitrogen atom, an oxygen atom, or a sulphur atom;

R^3 and R^4 are separately and independently in each occurrence a hydrogen atom, an alkyl moiety having less than 10 carbon atoms, an aryl moiety, or an aryl moiety having atoms other than carbon atoms in its nucleus;

m is an integer of 1 or 2; and

q is an integer of 1 or 2 provided that q is 2 only when R^1 or R^2 is a nitrogen atom.

4,996,289

CONTINUOUS PREPARATION OF AQUEOUS MELAMINE/FORMALDEHYDE PRECONDENSATE SOLUTIONS

Heinz Berbner, Moerlenbach; Klaus Ebel, Mutterstadt; Michael Kuczaty, Heidelberg; Bernhard Seid, Frankenthal; Frank P. Woerner, Wachenheim, and Hans D. Zettler, Gruenstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 17, 1989, Ser. No. 394,936

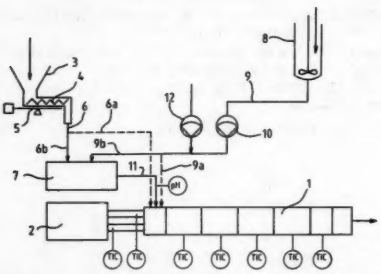
Claims priority, application Fed. Rep. of Germany, Aug. 25, 1988, 3828793

Int. Cl.[5] C08G *12/32*

U.S. Cl. 528—230 9 Claims

1. A process for the continuous preparation of an aqueous melamine/formaldehyde precondensate solution, which comprises; metering melamine and aqueous formaldehyde or mela-

mine and formaldehyde in a solid form together with water into a continuous mixer to produce a homogeneous mixture,



passing the homogeneous mixture into a single-screw or twin-screw extruder, at elevated temperatures.

4,996,290

POLYESTER AMIDES CONTAINING IMIDE GROUPS, PROCESS FOR THEIR PRODUCTION AND THEIR USE AS HOT-MELT ADHESIVES

Manfred Bolze, Bergkamen-Oberaden, and Manfred Drawert, Fröndenberg, both of Fed. Rep. of Germany, assignors to Schering AG, Berlin and Bergkamen, Fed. Rep. of Germany

Filed Feb. 28, 1990, Ser. No. 486,523

Claims priority, application Fed. Rep. of Germany, Mar. 18, 1989, 3909051

Int. Cl.[5] C08G *63/02*

U.S. Cl. 528—272 8 Claims

1. Polyester amide imides produced by condensation of

(1) from 0.1 to 0.95 equivalent of a dimerized fatty acid, and optionally

(2) from 0 to 0.85 equivalent of straight-chain aliphatic and-/or aromatic dicarboxylic acids having from 6 to 13 carbon atoms,

(3) from 0.05 to 0.5 equivalent of trimellitic anhydride,

(4) from 0.5 to 0.7 equivalent of even-numbered aliphatic diamines having from 2 to 12 carbon atoms, and

(5) from 0.3 to 0.6 equivalent of either a mixture of isomers of 3,8-dihydroxymethyltricyclo[5.2.1.$0^{2,6}$]decane 3,9-dihydroxymethyltricylo[5.2.1.$0^{2,6}$]decane 4,9-dihydroxymethyltricyclo[5.2.1.$0^{2,6}$]decane, 4,8-dihydroxymethyltricyclo[5.2.1.^{2,6}]decane and/or 1,4-dihydroxymethylcyclohexane.

4,996,291

THERMO-SHRINKABLE POLYESTER FILM

Yasuo Yoshinaka; Katsuaki Kuze, both of Shiga; Tsutomu Isaka, Komaki; Toshihiro Yamashita, Inuyama; Yujiro Matsuyama, Otsu; Koichiro Nakamura, Shiga; Tsuyoshi Matsunaga, Fukui, and Osamu Makimura, Ogaki, all of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

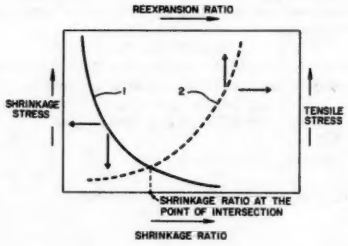
Continuation of Ser. No. 134,742, Dec. 18, 1987, abandoned. This application Sep. 8, 1989, Ser. No. 405,107

Claims priority, application Japan, Dec. 19, 1986, 61-305083; Dec. 29, 1986, 61-313318; Jun. 25, 1987, 62-159412; Nov. 25, 1987, 62-296890; Nov. 25, 1987, 62-296891; Dec. 18, 1987, 62-322217

Int. Cl.[5] C08G *63/02*

U.S. Cl. 528—272 9 Claims

1. A thermo-shrinkable polyester film obtained from a composition that comprises acid components including terephthalic acid and glycol components including ethylene glycol, wherein a film prepared from said composition is stretched in a certain direction by a stretching ratio of 4.0 or more, so that the resulting thermo-shrinkable polyester film has a heat-shrinkage ratio of 30% or more in said direction at 100° C. and a shrinkage ratio of 5% or more at the point of intersection of a curve showing the internal shrinkage stress of said thermo-



shrinkable film and a curve showing the tensile stress of said thermo-shrinkable film.

4,996,292

SELF-SEALING ARTIFICIAL SKIN COMPRISING COPOLY-ALPHA-AMINO ACID

Sidney W. Fox, 707 S. Valley Rd., Carbondale, Ill. 62901, and Peter R. Bahn, R.R. 1, Box 261, Woodlawn, Ill. 62898

Filed Jun. 30, 1989, Ser. No. 373,503

Int. Cl.[5] C08G *69/10*

U.S. Cl. 528—328 5 Claims

1. A self-sealing artificial skin consisting of copolyamino acids thermally polymerized from a mixture of the following alpha amino acids: aspartic acid, glutamic acid, lysine, alanine, arginine cysteine, glycine, histidine, isoleucine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, and valine.

4,996,293

COMPOSITION COMPRISING POLYIMIDE RESIN FROM DIPHENYL SULFONE -3,3',4,4'-TETRACARBOXYLIC ACID DIANHYDRIDE

Ikeda Tsuyoshi, Neyagawa, Japan, assignor to New Japan Chemical Co., Ltd., Kyoto, Japan

PCT No. PCT/JP88/00145, § 371 Date Oct. 12, 1988; § 102(e) Date Oct. 12, 1988

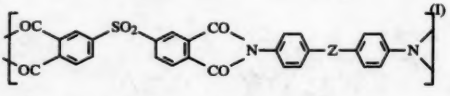
PCT Filed Feb. 12, 1988, Ser. No. 275,176

Claims priority, application Japan, Feb. 13, 1987, 62-32030; Jul. 17, 1987, 62-179752

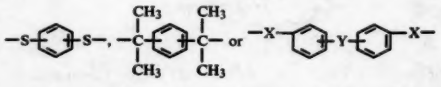
Int. Cl.[5] C08G *73/10;* C08L *79/08*

U.S. Cl. 528—352 15 Claims

1. A polyimide resin composition which comprises at least one polyimide having a repeating unit of the general formula



wherein Z is —S—,



in which X is —O—, —S—, or

Y is a single chemical bond or Y represents a bivalent group selected from the group consisting of —O—, —S—, —SO_2—,

and —CO—, and R^1 and R^2 are the same or different and each independently is a hydrogen atom, a halogen atom or a lower alkyl group optionally substituted by a halogen atom or atoms, and having an inherent viscosity (η_{inh}) measured in an N-methyl-2-pyrrolidone solvent at a concentration of 0.5 g/100 ml and at a temperature of 30±1° C. of about 0.3— about 5.0 dl/g, said polyimide being dissolved in an organic solvent.

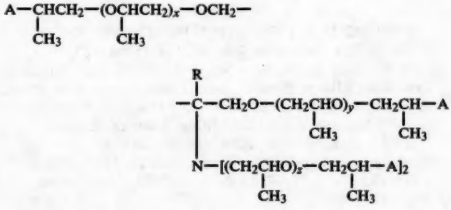
4,996,294

PREPARATION OF AMINOTETRAMINES

Michael Cuscurida; Wei-Yang Su, and George P. Speranza, all of Austin, Tex., assignors to Texaco Chemical Company, White Plains, N.Y.

Filed Oct. 31, 1989, Ser. No. 429,673
Int. Cl.[5] C08G *65/28, 65/32*
U.S. Cl. 528—421 **4 Claims**

1. A compound of the formula:



wherein:

R is an alkyl of from 1 to 5 carbon atoms,

x, y, and z each range from 2 to about 50,

A is —NH_2 or —OH, and wherein at least one of the A substituents is —NH_2.

4,996,295

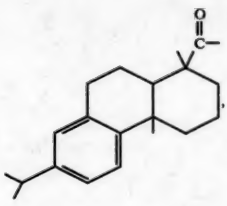
AMIDE LINKED ROSIN ACID DERIVATIVES

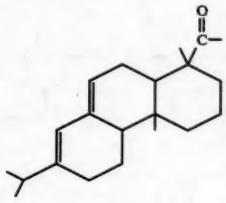
Lawson G. Wideman, and Paul H. Sandstrom, both of Tallmadge, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sep. 25, 1989, Ser. No. 411,972
Int. Cl.[5] C09F *1/04*
U.S. Cl. 530—221 **10 Claims**

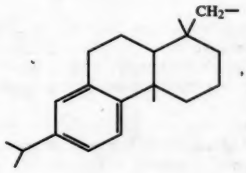
1. A composition comprising an amide linked rosin acid derivative of the formula:

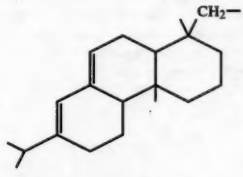
wherein R^1 is of the formula comprising:





or mixtures thereof an R^2 is of the formula comprising:





or mixtures thereof.

4,996,296

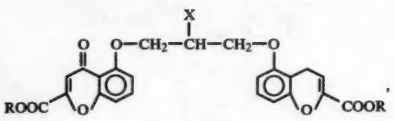
CROMOLYN BINDING PROTEIN IN HIGHLY PURIFED FORM, AND METHODS FOR THE ISOLATION THEREOF

Israel Pecht, Rehovot, Israel, and Stefan Hemmerich, Konstanz, Fed. Rep. of Germany, assignors to Yeda Research & Development Co., Ltd., Rehovot, Israel

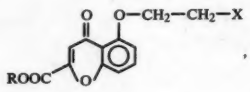
Continuation-in-part of Ser. No. 843,912, Mar. 20, 1986, Pat. No. 4,683,135, which is a continuation of Ser. No. 517,843, Jul. 27, 1983, abandoned. This application Jul. 27, 1987, Ser. No. 78,134
Int. Cl.[5] C07K *15/06, 3/20, 15/14*
U.S. Cl. 530—350 **10 Claims**

1. A method of purifying cromolyn binding protein, comprising:

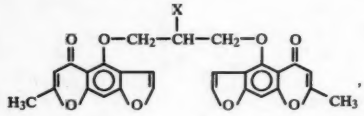
preparing a chromatography column packed with an insoluble matrix having bound thereto a cromolyn derivative of the general formula



(I)

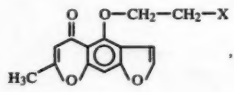


(II)



(III)

or



(IV)

wherein R is hydrogen or C_{1-5} alkyl and X is amino or an amino derivative;

lysing cells in which cromolyn binding protein is naturally occurring or solubilizing the plasma membrane of said cells;

separating any cromolyn binding protein contained in said lysed cells or solubilized membranes from the non-desired contaminants by passing said lysed cells or solubilized membranes through said column, whereby any cromolyn binding protein is retained on the column while non-desired contaminants pass through; and

eluting the cromolyn binding protein bound to said immobilized cromolyn derivative.

4,996,297

RECOMBINANTLY EXPRESSED RABBIT ZONA PELLUCIDA POLYPEPTIDES

Bonita S. Dunbar, Houston, Tex., assignor to Zonagen, Inc., The Woodlands, Tex.

Filed Oct. 7, 1987, Ser. No. 106,087
Int. Cl.[5] C07K *15/14*; A61K *37/02*
U.S. Cl. 530—395 **6 Claims**

1. A substantially pure polypeptide product of expression of a purified and isolated DNA sequence encoding a rabbit species zona pellucida protein, the DNA sequence being selected from the group consisting of a rabbit cDNA insert present in lambda bacteriophage designated A.T.C.C. #40377, A.T.C.C. #40378, or A.T.C.C. #40672, wherein said expressed polypeptide

(a) is specifically bound by antibodies which bind to an epitope present on a native rabbit zona pellucida protein selected from the group consisting of rabbit zona pellucida proteins having an approximate deglycosylated molecular weight of 50 kD, 75 kD, or 85 kD; and

(b) induces production of antibodies which bind specifically to zona pellucida proteins from different species of mammals when said polypeptide is used to immunize said different mammalian species.

4,996,298

MARKER FOR COLORECTAL CARCINOMA AND METHODS OF DETECTING THE SAME

Ronald R. Salem, Brookline; Peter Thomas, Pembroke, and Glenn Steele, Swampscott, all of Mass., assignors to New England Deaconess Hospital Corporation, Boston, Mass.

Division of Ser. No. 184,079, Apr. 20, 1988, Pat. No. 4,921,789.
This application Jan. 22, 1990, Ser. No. 448,673
Int. Cl.[5] C07K *15/14*; C12P *21/06*
U.S. Cl. 530—395 **3 Claims**

1. An isolated, partially purified colorectal carcinoma (CC) glycoprotein, said glycoprotein being characterized by:

(a) a molecular weight of approximately 160,000 daltons as determined by electrophoresis on polyacrylamide gels containing sodium dodecyl sulfate;

(b) reacting with an antibody which binds undifferentiated colorectal carcinoma cells;

(c) being located on the surface of a colorectal carcinoma cell;

(d) not cross-reacting with antibodies which bind carcinoembryonic antigen (CEA);

(e) not cross-reacting with antibodies which bind sialyated Lewis a antigen;

(f) not cross-reacting with antibodies which bind alpha-1-acid glycoprotein;

(g) not cross-reacting with antibodies which bind nonspecific cross-reacting antigen (NCA);

(h) not cross-reacting with antibodies which bind any of blood group substances A, B, or H; and

(i) not found on cancerous pancreatic or lung cells.

4,996,299

METHOD FOR PREPARING PERTUSSIS TOXIN TOXOID USING HCHO AND AMINO ACIDS

Akihiro Ginnaga, Kumamoto; Kazunori Morokuma, Houtaku; Katsutoshi Aihara, Kamoto, and Mitsuo Sakoh, Kumamoto, all of Japan, assignors to Juridical Foundation The Chemo-Sero-Therapeutic Research Institute, Kumamoto, Japan

Filed Nov. 28, 1989, Ser. No. 442,148
Claims priority, application Japan, Nov. 29, 1988, 63-303767
Int. Cl.[5] A61K *39/10*; C12N *9/12*; C07K *3/08, 15/04*
U.S. Cl. 530—409 **6 Claims**

1. A method for preparing pertussis toxin toxoid by a treatment of pertussis toxin with formaldehyde, which comprises carrying out said treatment in the presence of lysine or glycine in combination with one or more of amino acids selected from the group consisting of N-acetyl-DL-triptophan, N-acetyl-D-triptophan and N-acetyl-L-triptophan.

4,996,300

PREPARATION OF RARE EARTH ALKOXIDES USING CATALYST

Carl C. Greco, Garnerville, and Johst H. Burk, Mohegan Lake, both of N.Y., assignors to Akzo America Inc., New York, N.Y.

Filed May 31, 1988, Ser. No. 200,471
Int. Cl.[5] C07F *5/00*
U.S. Cl. 534—15 **10 Claims**

1. A catalytic process for the manufacture of rare earth alkoxides by the reaction of a rare earth metal and an alcohol in the presence of a catalytically effective amount of a zinc-containing catalyst for the reaction.

4,996,301

POLYFUNCTIONAL α-DIAZO-β-KETO ESTERS AND THEIR USE IN LIGHT-SENSITIVE COMPOSITIONS

Peter Wilharm, Wiesbaden; Hans-Joachim Merrem, Seeheim-Jugenheim, and Georg Pawlowski, Wiesbaden, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

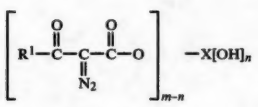
Filed Jan. 12, 1990, Ser. No. 464,003

Claims priority, application Fed. Rep. of Germany, Jan. 12, 1989, 3900735

Int. Cl.[5] C07C 245/18, 245/14; C07F 5/02

U.S. Cl. 534—556 30 Claims

1. A polyfunctional α-diazo-β-keto ester which has the general formula I



(I)

in which

R^1 denotes an aliphatic, cycloaliphatic or araliphatic or aromatic radical having 4 to 20 carbon atoms, in which individual CH_2 groups can be replaced by divalent atoms or divalent groups selected from the group consisting of oxygen, sulfur, NH and carbonyl, and individual CH groups can be replaced by —N—,

X denotes an at least divalent aliphatic, cycloaliphatic, carbocyclic, heterocyclic or araliphatic radical having 2 to 22 carbon atoms, in which individual CH_2 groups can be replaced by oxygen or sulfur atoms or by the groups

$-NR^2-$, $-C(O)-O-$, $-C(O)-NR^2-$,

$-NR^2-C(O)-NR^3-$, $-O-C(O)-NR^2-$,

$-O-C(O)-N-$ or $-O-C(O)-O-$ or

CH groups can be replaced by —C(O)—N— or —N—,

in which R^2 and R^3 independently of one another represent hydrogen or an aliphatic, carbocyclic or araliphatic radical having 1 to 15 carbon atoms,

m denotes an integer from 2 to 10 and

n denotes an integer from 0 to 2,

wherein

m−n is ≧2.

4,996,302

PROCESS FOR THE PREPARATION OF POLYAZO DYES

Horst Langfeld, Grenzach-Wyhlen, Fed. Rep. of Germany, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 7, 1988, Ser. No. 280,802

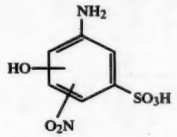
Claims priority, application Switzerland, Dec. 16, 1987, 4923/87

Int. Cl.[5] C09B 33/24, 33/18, 45/24, 45/01

U.S. Cl. 534—582 14 Claims

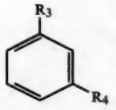
1. A process for the preparation of polyazo dyes, wherein

(a) a compound of the formula



(1a)

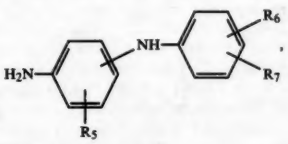
is diazotized and coupled onto a compound of the formula



(2)

in which R_3 and R_4, independently of one another, are hydroxyl or amino,

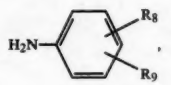
(b) a compound of formula



(3)

in which R_5 and R_6, independently of one another, are hydrogen or sulfo and R_7 is nitro, C_1–C_4alkyl, C_1–C_4alkoxy or halogen, is diazotized and coupled onto the product obtained according to (a),

(c) a compound of the formula



(4)

in which R_8 is hydrogen, C_1–C_4alkyl, C_1–C_4alkoxy, halogen, carboxy or sulfo and R_9 independently has the meaning of R_8 or is nitro, is diazotized and coupled onto the product obtained according to (b),

(d) a further compound of the abovementioned formula (3) is diazotized and coupled onto the product obtained according to (c), and

(e) the product obtained according to (d) is metallized with an iron, cobalt, nickel, chromium or copper compound, wherein the total amount of the compound of formula (3) used in steps (b) and

(d) is 0.7 to 1.5 moles per mole of the compound of formula (2) and 15 to 50% of which are used in step (b) and the remaining amount, that is 85 to 50%, is used in step (d).

4,996,303

PREPARATION OF 1:2 METAL COMPLEX DYES BY COUPLING IN THE PRESENCE OF A METAL DONOR IN AN INERT GAS ATMOSPHERE

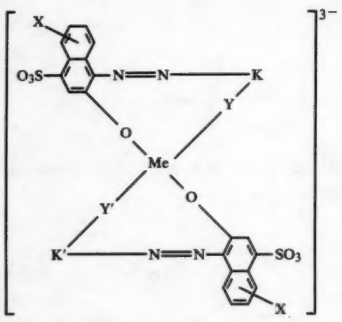
Alois Püntener, Rheinfelden, Switzerland, and Daniel Parisot, Saint-Genis-Laval, France, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Nov. 22, 1988, Ser. No. 275,240

Int. Cl.[5] C09B 45/01, 45/16, 45/20

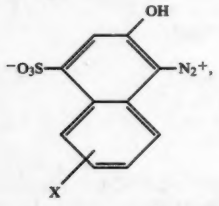
U.S. Cl. 534—602 22 Claims

1. A process for the preparation of a 1:2 metal complex azo dye of the formula



(1)

wherein each X is hydrogen, halogen or nitro, K and K′ are each independently of the other a benzene, naphthalene or pyrazolone coupling component, which is unsubstituted or substituted by C_1–C_6alkyl, C_1–C_6alkoxy, C_2–C_6alkanoylamino, C_2–C_6alkanoyl, C_1–C_6alkoxycarbonylamino, phenyl, halogen, hydroxy, sulfo, —SO_2NH_2, —SO_2NH—C_1–C_6alkyl, —$SO_2N(C_1$–C_6alkyl$)_2$, phenylaminosulfonyl, which is unsubstituted or substituted in the phenyl nucleus by sulfo or carboxy, SO_2—C_1–C_6alkyl or phenylsulfonyl, Y and Y′ are each —O— or —N(R), wherein R is hydrogen, C_1–C_4alkyl or phenyl, Me is chromium or cobalt and Ka is a cation, and Y and Y′ are attached to K and K′ adjacent to the azo group, by coupling and metallizing, which process comprises coupling in an inert gas atmosphere, in aqueous solution, a diazo component of formula



(2)

wherein X is as defined for formula (1), in the presence of the 5- to 30-fold molar amount of sodium chloride and/or potassium chloride, based on the molar amount of diazo component, and in the presence of a compound that donates a chromium or cobalt atom, to coupling components of formulae

HK—YH and HK′—Y′H (3),

wherein K′, Y and Y′ are as defined for formula (1).

4,996,304

REACTIVE DISAZO DYES CONTAINING FLUORO-CHLOROPYRIMIDYL GROUPS AND VINYL SULFONYL GROUP

Athanassios Tzikas, Pratteln, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

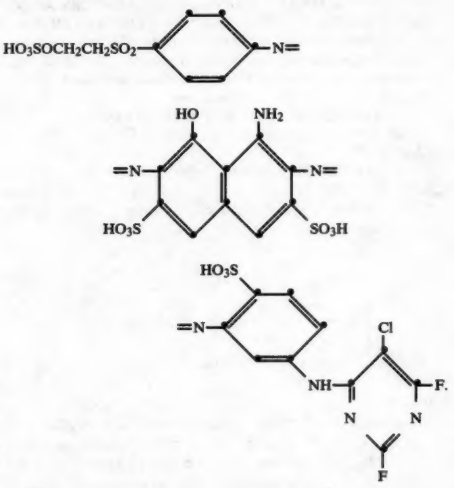
Continuation of Ser. No. 116,900, Nov. 5, 1987, abandoned, which is a division of Ser. No. 636,363, Jul. 30, 1984, Pat. No. 4,746,732. This application Feb. 23, 1990, Ser. No. 488,373

Claims priority, application Switzerland, Jul. 29, 1983, 4170/83

Int. Cl.[5] **C09B** *62/03, 62/05, 62/513;* **D06P** *1/38*

U.S. Cl. 534—637 **1 Claim**

1. The reactive dye of the formula



4,996,305

PROCESS FOR PRODUCING THE ANTIBIOTIC AND ANTITUMOR AGENTS LL-E33288ε-I AND LL-E33288ε-BR

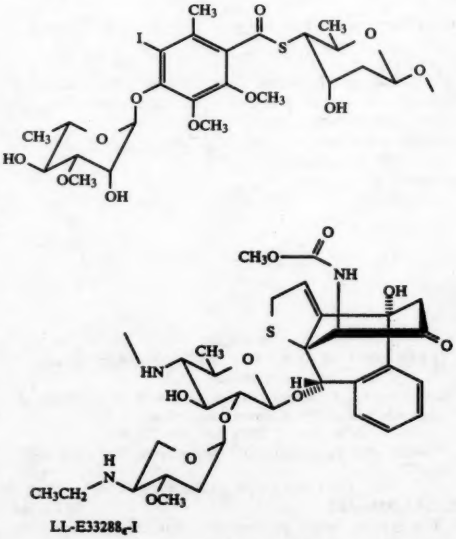
William J. McGahren, Demarest, N.J., and George A. Ellestad, Pearl River, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

The portion of the term of this patent subsequent to Dec. 18, 2007, has been disclaimed.

Int. Cl.[5] **C07H** *15/00, 1/00*

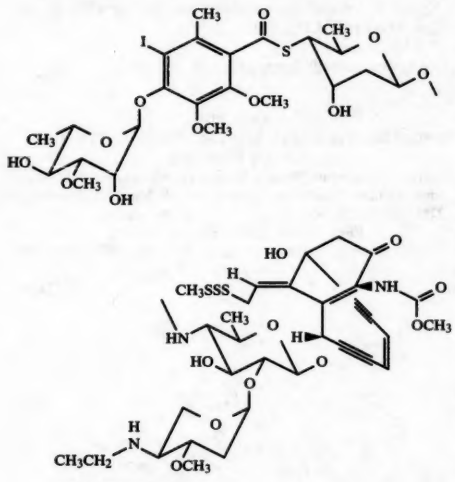
U.S. Cl. 536—17.5 **8 Claims**

1. A process for producing the antibacterial agent LL-E33288ε-I, having the structure:



LL-E33288ε-I

which comprises reacting LL-E33288γ_1-I having the structure:



LL-E33288$_{\gamma 1}$-I

with triphenylphosphine or a sulfhydryl-containing reagent in a solvent, followed by chromatographic separation and purification of the LL-E33288ϵ-I.

4,996,306

GLYCOSIDE PREPARATION DIRECTLY FROM AQUEOUS SACCHARIDE SOLUTIONS OR SYRUPS

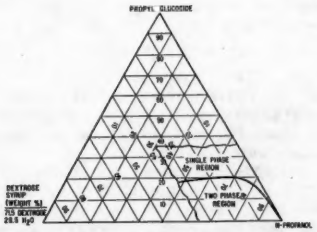
Robert S. McDaniel, Jr., Decatur, Ill., and Donald L. Johnson, Muscatine, Iowa, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf-Holthausen, Fed. Rep. of Germany

Filed Apr. 5, 1988, Ser. No. 178,047

The portion of the term of this patent subsequent to Jan. 26, 2005, has been disclaimed.

Int. Cl.[5] C07G 3/00; C07H 1/00; C08B 37/00

U.S. Cl. 536—18.6 **19 Claims**



1. A process for preparing a glycoside product by reacting a water soluble monosaccharide or oligosaccharide reactant with a C_7 to C_{30} alcohol reactant, which process comprises:

a. admixing said alcohol reactant with the aqueous solution of said monosaccharide or oligosaccharide reactant to form a homogeneous, single phase aqueous reaction medium which comprises said monosaccharide or oligosaccharide reactant, the alcohol reactant and water and which is free of any, distinct, substantially alcohol reactant-free aqueous monosaccharide or oligosaccharide solution phase; and

b. reacting said monosaccharide or oligosaccharide reactant with said alcohol reactant to thereby form said glycoside product by contacting said homogeneous aqueous reaction medium with an acid catalyst at an elevated temperature while removing water from the reaction mixture at a rate sufficient to prevent the formation of a separate and distinct, substantially alcohol reactant-free aqueous phase during the course of said reaction.

4,996,307

PREPARATION OF WATER-SOLUBLE ACYLATED CHITOSAN

Hiroshi Itoi, Kamagaya; Hiroshi Sano, Narashino, and Kenichiro Shibasaki, Tokyo, all of Japan, assignors to Lion Corporation, Tokyo, Japan

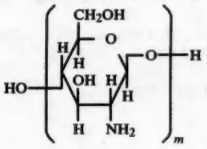
Filed Jun. 25, 1986, Ser. No. 878,340

Claims priority, application Japan, Jun. 28, 1985, 60-142710

Int. Cl.[5] C07H 5/04; C08B 37/08

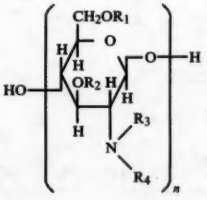
U.S. Cl. 536—20 **18 Claims**

1. A process for preparing an amorphous water-soluble acylated chitosan which is a copolymer of a substance having the formula:



(3)

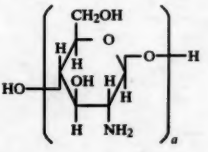
and a substance having the formula:



(4)

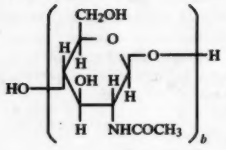
wherein R_1, R_2, R_3, and R_4 are independently selected from the group consisting of a hydrogen atom and an acyl group of the formula COR' where R' is selected from the group consisting of an alkyl group having 1 to 5 carbon atoms and a phenyl group, with the provisos that at least one of R_1, R_2, R_3 and R_4 is an acyl group, $m+n \geq 15$ and a degree of acylation represented by the formula $m/(m+n)=0.35$ to 0.65, comprising the steps of:

dissolving a water-insoluble chitosan which is a random copolymer of a substance having the formula:



(1)

and a substance having the formula:



(2)

wherein

a+b≧15 and a/(a+b)=0.7 to 1, in an aqueous acid solution;

diluting the solution with water or a water-miscible solvent; and

adding an acylation agent to the diluted solution in an amount sufficient to form a homogeneous solution of said amorphous water-soluble acylated chitosan having a degree of acylation of 0.35 to 0.65 so that the solution is prevented from gelatinizing.

4,996,308

DERIVATIVES WITH UNSATURATED SUBSTITUTIONS FOR THE 5'-HYDROXYMETHYL GROUP

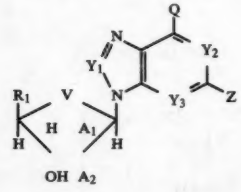
Michael L. Edwards, Cincinnati; James R. McCarthy, West Chester, and Nellikunja J. Prakash, Cincinnati, all of Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Filed Mar. 25, 1988, Ser. No. 173,782

Int. Cl.[5] C07H *19/167, 19/173*

U.S. Cl. 536—26 **25 Claims**

1. A compound of the formula



wherein

V is oxy,

R_1 is ethynyl or cyano,

A_1 and A_2 are each independently hydrogen or hydroxy with the provisos that where A_1 is hydroxy, A_2 is hydrogen, and that where A_2 is hydroxy, A_1 is hydrogen,

Y_1 is nitrogen or a CH group,

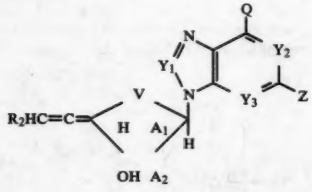
Y_2 and Y_3 are each independently nitrogen or a CH group,

Q is NH_2 or $NHCH_3$, and

Z is hydrogen;

and pharmaceutically-acceptable salts thereof.

2. A compound of the formula



wherein

V is oxy

R_2 is hydrogen or C_1–C_4 alkyl,

A_1 and A_2 are each independently hydrogen or hydroxy with the provisos that where A_1 is hydroxy, A_2 is hydrogen, and that where A_2 is hydroxy, A_1 is hydrogen,

Y_1 is nitrogen or a CH group,

Y_2 and Y_3 are each independently nitrogen or a CH group,

Q is NH_2 or $NHCH_3$, and

Z is hydrogen;

and pharmaceutically-acceptable salts thereof.

4,996,309

PROCESS FOR PREPARING SUCROSE FATTY ACID ESTER POWDER

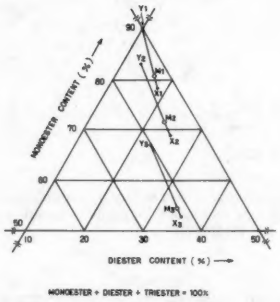
Shusaku Matsumoto, Kyoto; Yoshio Hatakawa, Higashiosaka, and Akihiko Nakajima, Kyoto, all of Japan, assignors to Dai-Ichi Kogyo Seiyaku Co., Ltd., Kyoto, Japan

Filed Oct. 3, 1989, Ser. No. 416,611

Claims priority, application Japan, Nov. 14, 1988, 63-287208

Int. Cl.[5] C07H *1/00, 13/00, 11/00*

U.S. Cl. 536—119 **23 Claims**



1. A process for preparing a powder of sucrose fatty acid esters, which comprises reacting sucrose with a fatty acid alkyl ester in an aqueous reaction system containing a catalyst to produce a sucrose fatty acid ester, adjusting the resulting reaction mixture to a neutral pH region, adding water and a neutral salt to the reaction mixture to precipitate the sucrose fatty acid ester product, separating the resulting precipitate from the liquid phase, washing the precipitate with an acidic water, subjecting the washing liquid to ultrafiltration, spray drying the resulting concentrate in the form of an aqueous solution, and recovering the unreacted sucrose by subjecting the liquid phase to reverse osmosis.

4,996,310

POLYOL-POLYETHER WITH HIGH CONTENT OF ETHYLENE OXIDE AND LOW VISCOSITY

Roberto M. Acosta, Toluca, Mexico, assignor to Polioles, S. A. de C.U., Col. Condesa, Mexico

Filed Mar. 10, 1989, Ser. No. 321,786

Int. Cl.[5] C07H *15/00, 1/00, 3/00;* **C07C** *43/00;* **A61K** *31/00*

U.S. Cl. 536—120 **12 Claims**

1. A polyol-polyether having a molecular weight between 400 and 900, a viscosity between 500 and 3500 centipoises at 25 degrees C., and a content of ethylene oxide between 40% and 75% by weight, prepared by a process which comprises the steps of:

(a) forming a suspension of sucrose in a triol;

(b) reacting the mixture obtained in the prior step with propylene oxide in the presence of a catalyzer;

(c) suspending sucrose in the mixture obtained in the prior step;

(d) oxyethylizing the mixture of step (c); and

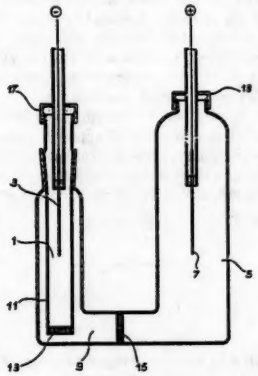
(e) eliminating the volatile components of the mixture and the catalyzer, thus obtaining the desired polyol-polyether.

4,996,311

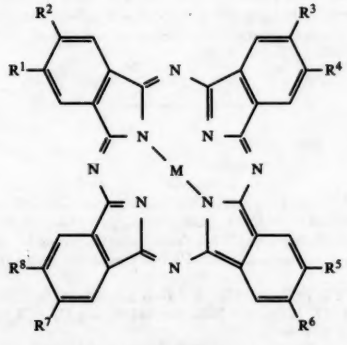
OCTASUBSTITUTED LITHIUM PHTHALOCYANINES, THEIR METHOD OF PREPARATION AND THEIR USE IN EPR (ELECTRONIC PARAMAGNETIC RESONANCE) MAGNETOMETRY

Mehdi Moussavi, and Liliane Secourgeon, both of Saint Egreve, France, assignors to Commissariat A. L'Energie Atomique, Paris, France

Filed Jul. 14, 1989, Ser. No. 379,980
Claims priority, application France, Jul. 20, 1988, 88 09831
Int. Cl.[5] C09B 47/04
U.S. Cl. 540—139 6 Claims



1. Octasubstituted Lithium phthalocyanine corresponding to the formula :



(I)

in which R^1, R^2, R^3, R^4, R^5, R^6, R^7 and R^8, which are identical or different, represent an alkoxy or alkyl radical having from 1 to 3 carbon atoms, optionally substituted by one or more fluorine atoms, and M represents Li.

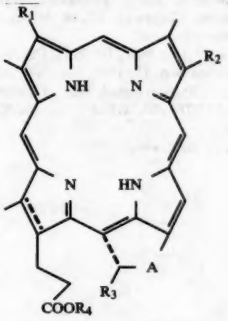
4,996,312

PORPHYRIN DERIVATIVES, AND THEIR PRODUCTION AND USE

Isao Sakata, Okayama; Susumu Nakajima, Ashahikawa; Koichi Koshimizu, Nara; Natsuki Samejima, Ashahikawa; Kazumi Inohara, Fukuyama; Hiroyuki Takata, Okayama; Hirohiko Yamauchi; Nobuo Ueda, both of Chiba, and Masaaki Hazue, Amagasaki, all of Japan, assignors to Nihon Medi-Physics Co., Ltd., Hyogo and Toyo Hakka Kogyo Co., Ltd., Okayama, both of, Japan

The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.
Continuation of Ser. No. 922,492, Oct. 23, 1986, Pat. No. 4,849,207. This application Apr. 19, 1989, Ser. No. 340,549
Claims priority, application Japan, Oct. 23, 1985, 60-235322; Oct. 23, 1985, 60-235323
Int. Cl.[5] C07D 487/22
U.S. Cl. 540—145 5 Claims

1. A condensation product of (a) a porphyrin compound of the formula:



(I)

wherein R_1 and R_2 are each —CH=CH_2, —CH_2CH_3, —CH(O-lower alkanoyl)CH_3, —CH(OR)CH_3 or —CH(O-lower alkylene-OR)CH_3; R_3 is —H, —COOH, —COO-lower alkyl, —COO-lower alkylene-OR or —COO-lower alkylene-OOC-Z; R_4 is —H, -lower alkyl or -lower alkylene-OR; R is —H or -lower alkyl; Z is a residue of the compound of the formula (I) excluding R_3 therefrom; A is —CH_2 or —CO; and the dotted line from the gamma-position indicates no bonding or a single direct bond; the dotted line between the 7- and 8-positions indicates the presence of a single bond or a double bond; when R_3 is other than —COOH, at least one of R_1, R_2, R_3 and R_4 being a group containing R=—H; and when R_3 is —COO-lower alkylene-OOC-Z, R_1 being capable of representing 1-iodoethyl in addition to said meanings; with (b) a polyfunctional carboxyl compound, wherein the compound (b) is condensed with the side chain at the 6- or 7-position of the compound (a), the compound (b) is an amino acid and the condensation is made between a carboxyl group in the compound (a) and an amino group in the compound (b) through a carbonamide linkage.

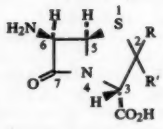
4,996,313

PENICILLINS

Jack E. Baldwin, Oxford, England, assignor to National Research Development Corporation, England

Continuation of Ser. No. 933,535, Nov. 21, 1986, abandoned. This application Nov. 17, 1989, Ser. No. 438,622
Claims priority, application United Kingdom, Nov. 26, 1985, 8529063
Int. Cl.[5] C07D 499/42; A61K 31/43
U.S. Cl. 540—312 9 Claims

1. A compound of formula II:



(II)

wherein R is hydrogen or an alkyl group of 1 to 5 carbon atoms and R' is an alkoxy group of 1 to 5 carbon atoms, and pharmaceutically acceptable salts and esters thereof.

4,996,314

6-(DISUBSTITUTED AMINO)CARBAPENEM COMPOUNDS

Takeo Yoshioka, Ayase; Noritaka Chida, Sagamihara; Azuma Watanabe, Yokohama; Yasuo Fukagawa, Kamakura, and Tomoyuki Ishikura, Chigasaki, all of Japan, assignors to Sanraku Incorporated, Japan

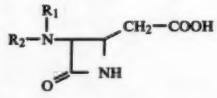
Division of Ser. No. 24,160, Mar. 10, 1987, Pat. No. 4,812,563. This application Sep. 19, 1988, Ser. No. 246,071

Claims priority, application Japan, Mar. 11, 1986, 61-51556

Int. Cl.[5] C07D *205/085, 403/04, 487/04*

U.S. Cl. 540—364 **5 Claims**

1. A compound of the formula



wherein

R_1 represents C_1–C_6 alkyl or C_1 –C_6 haloalkyl, and

R_2 represents (1) C_1 –C_6 alkyl, (2) C_1–C_6 haloalkyl, (3) benzyl, (4) phenethyl, (5) —$COOR_4$ or (7) —SO_2R_5 wherein R_4 represents (1) C_1–C_6 alkyl, (2) benzyl, (3) phenethyl or (4) dibenzyl in which the armomatic rings of the groups (2), (3) or (4) are unsubstituted or are substituted by halogen, C_1–C_6 alkyl, C_1–C_6 alkoxy, nitro or amino, and R_5 represents (1) C_1–C_6 alkyl, (2) phenyl or (3) naphthyl in which the aromatic rings of the groups (2) and (3) are unsubstituted or are substituted by halogen, C_1–C_6 alkyl, C_1–C_6 haloalkyl, C_1 –C_6 alkoxy, nitro or amino.

4,996,315

SYNTHESIS OF CYCLIC COMPOUNDS

George P. Speranza, Austin, and Jiang-Jen Lin, Houston, both of Tex., assignors to Texaco Chemical Company, White Plains, N.Y.

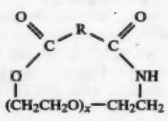
Filed Jan. 16, 1990, Ser. No. 465,682

Int. Cl.[5] C07D *269/00*

U.S. Cl. 540—454 **18 Claims**

1. A method of producing novel cyclic ester-amides by reacting polyalkylene glycol monoamines with dicarboxylic acids and esters thereof in a molar ratio of about 1:1.

17. Novel cyclic ester-amides having the formula:



where R is an alkyl group having from 3 to 5 carbon atoms, and x ranges from 2 to 6.

4,996,316

PROCESS FOR THE PREPARATION OF TERTIARY N, N-DIMETHYLAMINES

Jürgen Weber, Oberhausen; Detlef Kampmann, Bochum, and Claus Kniep, Oberhausen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Dec. 24, 1988, Ser. No. 281,801

Claims priority, application Fed. Rep. of Germany, Dec. 9, 1987, 3741726

Int. Cl.[5] C07C *209/26*

U.S. Cl. 544—1 **60 Claims**

1. A process for the preparation of tertiary N,N-dimethylamine comprising a reaction among a mixture of at least one primary amine, formaldehyde, and hydrogen as starting materials at elevated temperature and pressure in the presence of a hydrogenation catalyst consisting essentially of nickel as a catalytically active metal, said catalyst being in a liquid form suspended in a solvent, the concentration of said nickel being 0.1% to 10% by weight based on said primary amine, said catalyst containing at least 10% nickel by weight, said primary amine and said formaldehyde being separately and simultaneously supplied to said reaction at 80° to 150 ° C. and under a pressure of 1 to 15 MPa, whereby said tertiary N,N-dimethylamine is formed in a single reaction step.

4. The process of claim 1 wherein said primary amine is taken from the class consisting of aliphatic amines, cycloaliphatic amines, araliphatic amines, aromatic amines, heterocyclic amines having 4 to 20 carbon atoms and containing at least one atom of oxygen, sulfur, or nitrogen, and mixtures thereof.

4,996,317

CAFFEINE RECOVERY FROM SUPERCRITICAL CARBON DIOXIDE

Michael J. O'Brien, Port Monmouth; Jean E. Spence, Bogota; Ronald H. Skiff, Edison, all of N.J.; Gerald J. Vogel, Carrollton, Tex., and Ravi Prasad, Midlothian, Va., assignors to Kraft General Foods, Inc., Glenview, Ill.

Filed Aug. 5, 1988, Ser. No. 229,369

Int. Cl.[5] A23F *5/18*

U.S. Cl. 544—274 **8 Claims**

1. A process for the extraction of caffeine from supercritical carbon dioxide where separation efficiency is improved and is comparable to packed column performance for similar extraction systems which comprises countercurrently contacting water with caffeine-containing supercritical carbon dioxide in a column which is substantially open from end to end.

4,996,318

AMINO-9,10-SECOSTEROIDS USEFUL FOR TREATING HEAD INJURY, SPINAL CORD TRAUMA OR STROKE

Martin Gall, Kalamazoo, Mich., and Robert I. Higuchi, Palo Alto, Calif., assignors to The Upjohn Company, Kalamazoo, Mich.

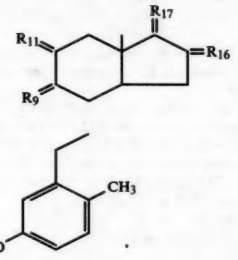
PCT No. PCT/US88/00817, § 371 Date Sep. 19, 1989, § 102(e) Date Sep. 19, 1989, PCT Pub. No. WO88/07527, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 18, 1988, Ser. No. 438,480

Int. Cl.[5] C07D *405/00, 403/00, 279/12, 413/00, 253/00, 239/02, 241/00, 241/02, 413/00, 277/04, 209/04;* **C07C** *221/00*

U.S. Cl. 544—295 **18 Claims**

1. An amino-9,10-secosteroid of formula I



(I)

where:

R_3 is —H or —CO—R_{3-1} where R_{3-1} is C_1–C_4 alkyl or phenyl optionally substituted with 1 or 2 R_{3-2} where R_{3-2} is —CH_3, —OCH_3, —F and —Cl; where:

(C-I) R_9 is R_{9-1}:R_{9-2} and R_{11} is R_{11-1}:R_{11-2}, where one of R_{9-1} and R_{9-2} is —H and the other taken together with one of R_{11-1} and R_{11-2} to form a second bond between C_9 and C_{11} and the other of R_{11-1} and R_{11-2} is —H;

(C-II) R_9 is —H;—H and R_{11} is =O;

(C-III) R_9 is —H:—H and R_{11} is α-R_{11-3}:β-R_{11-4} where one of R_{11-3} and R_{11-4} is —H or —OH and the other is —H;

(D-I) R_{16} is R_{16-1}:R_{16-2} and R_{17} is R_{17-1}:R_{17-2}, where one of R_{16-1} and R_{16-2} is —H or —CH_3 and the other taken together with one of R_{17-1} and R_{17-2} forms a second bond between C_{16} and C_{17}, and the other of R_{17-1} and R_{17-2} is —C(=Z)—$(CH_2)_n$—$NR_{21A}R_{21B}$, where Z is =O, =CH_2 or R_{20-1}:—H where R_{20-1} is —H or —CH_3, where n is 0 through 6, where

(A) R_{21A} is

(1) —$(CH_2)_m$—NR_{21-1}—heteroaryl, where m is 2, 3, or 4, where R_{21-1} is —H or C_1–C_3 alkyl, where heteroaryl is:

(a) pyridin-2- (F-1), 3- (F-2) or 4-yl (F-3) or the N-oxide thereof optionally substituted by 1 or 2 R_{21-2}, being the same or different, where R_{21-2} is

(i) —F,

(ii) —Cl,

(iii) —Br,

(iv) C_1–C_5 alkyl,

(v) —CH_2—CH=CH_2,

(vi) —aryl, where aryl is phenyl optionally substituted with 1 through 2 —F, —Cl, —Br, C_1–C_3 alkoxy, —COOH, —NH_2, C_1–C_3 alkylamino, di(C_1–C_3)alkylamino, where the alkyl groups are the same or different, 1-pyrrolidinyl-, 1-piperidinyl, 1-hexamethylenimino—, 1-heptamethylenimino—, C_2–C_4 acylamino and —NH—CHO

(vii) —$NR_{21-3}R_{21-3}$ where the R_{21-3}s are the same or different and are —H, C_1–C_3 alkyl or —CH_2—CH=CH_2,

(viiiα) *CH_2—$(CH_2)_q$—CH_2—N*— where the atoms marked with an asterisk (*) are bonded to each other resulting in the formation of a ring, where q is 1 through 5,

(viiiβ) *CH_2—CH_2—$(CH_2)_c$—G—$(CH_2)_d$—CH_2—CH_2—N*— where the atoms marked with an asterisk (*) are bonded to each other resulting in the formation of a ring (F-4), where G is —O—, —S—, —SO—, —SO_2— or —NHR_{21-4}, where R_{21-4} is —H, C_1–C_3 alkyl, or aryl as defined above, where c and d are the same or different and are 0 through 2 with the proviso that the total number of ring carbon atoms is 4, 5 or 6,

(ix) 3-pyrrolin-1-yl, (F-5)

(x) pyrrol-1-yl optionally substituted with C_1–C_3 alkyl, (F-6)

(xi) piperidin-1-yl optionally substituted with 1 or 2 C_1–C_3 alkyl, (F-7)

(xii) 1,2,3,6-tetrahydropyridin-1-yl, (F-8)

(xiii) 1-hexamethyleneimino containing a 3- or 4- double bond or 3- and 5- double bonds, (F-9)

(xiv) 1,4-dihydro-1-pyridinyl substituted in the 4 position by two C_1–C_3 alkyl being the same or different, (F-10)

(xv) —OH,

(xvi) C_1–C_3 alkoxy,

(xvii) —NR_{21-7}-$(CH_2)_e$-Q where Q is 2-pyridinyl where R_{21-7} is —H or C_1–C_3 alkyl and e is 0 through 3,

(xviii) pyridin-2-, 3- or 4-yl,

(xix) —CF_3

(xx) —CCl_3

(b) 1,3,5-triazin-2-yl or the N-oxide thereof optionally substituted at the 4- and/or 6- position with R_{21-2} where R_{21-2} is as defined above, (F-11)

(c) pyrimidin-4-yl or the N-oxide thereof optionally substituted at the 2- and/or 6- and 5- and/or 6- position with R_{21-2} where R_{21-2} is as defined above, (F-12)

(d) pyrimidin-2-yl optionally substituted at 4-and/or 6-position with 1 or 2 R_{21-2} as defined above, (F-13)

(e) pyrazin-2-yl optionally substituted with 1 or 2 R_{21-2} as is defined above, (F-14)

(f) imidazol-2-yl optionally substituted in the 1 position with C_1–C_3 alkyl or -aryl, where aryl is as defined above, and further optionally substituted with 1 or 2 R_{21-2} as defined above, (F-15)

(g) 1,3,4-triazol-2-yl optionally substituted in the 1 position with C_1–C_3 alkyl or -aryl, where aryl is as defined above, and further optionally substituted with R_{21-2} as defined above, (F-16)

(h) imidazol-4- or 5-yl optionally substituted in the 1 position with C_1–C_3 alkyl or -aryl, where aryl is as defined above, and further optionally substituted with 1 or 2 R_{21-2} as defined above, (F-17)

(i) benzo[b]thien-2-yl, (F-18)

(j) indol-2-yl, (F-19)

(k) benzo[b]thiazol-2-yl, (F-20)

(l) benzimidazol-2-yl, (F-21)

(m) 4-[2-[4-[2,6-bis(1-pyrrolidinyl)-4-pyrimidinyl]-1-piperazinyl]ethyl]piperazinyl, (F-22)

(n) 1,2,4-triazin-3-yl optionally substituted at the 5- and/or 6- position with R_{21-2} as is defined above, (F-23)

(2) (1-piperazinyl)-(C_2–C_4)alkyl optionally substituted in the 4- position with -aryl or -heteroaryl as defined above, (F-24)

(3) -heteroaryl, as defined above,

(4) —$(CH_2)_m$—X_4 where m is as defined above and where X_4 is

(a) —O—CH_2CH_2—Y, where Y is C_1–C_3 alkylamino, di(C_1–C_3)alkylamino where the alkyl groups are the same or different, C_3–C_6 alkyleneimino, optionally substituted with 1 or 2 C_1–C_3 alkyl,

(b) —$NR_{21-5}CH_2CH_2$—Y, where R_{21-5} is —H or C_1–C_3 alkyl and Y is as defined above,

(c) —$(CH_2)_g$—N(R_{21-5})-heteroaryl, where g is 2, 3 or 4, and where R_{21-5} and heteroaryl are as defined above,

(6) —$(CHCH_3)_b$—$(CH_2)_f$—R_{21-9}, where b is 0 and f is 1 through 3 or b is one and f is 0 through 3, where R_{21-9} is phenyl substituted with 1 through 3 —OH, C_1–C_3 alkoxy, —$NR_{21-10}R_{21-11}$ where R_{21-10} and R_{21-11} are the same or different and are —H, C_1–C_3 alkyl or are taken together with the attached nitrogen atom to form a C_4–C_7 cyclicamino ring,

(7) -$(CH_2)_i$-heteroaryl, where i is 1 through 4 and heteroaryl is as defined above,

(8) (1-piperazinyl)acetyl substituted in the 4- position by heteroaryl where heteroaryl is as defined above, (F-25)

(9) (1-piperazinyl)carbonylmethyl substituted in the 4-position by -heteroaryl where heteroaryl is as defined above, and (F-26)

(B) R_{21B} is

(1) —H,

(2) C_1–C_3 alkyl,
(3) C_5–C_7 cycloalkyl,
(4) —$(CH_2)_m$—$NR_{21\text{-}1}$-heteroaryl, where m, $R_{21\text{-}1}$ and heteroaryl are as defined above,
(5) (1-piperazinyl)-(C_2–C_4)alkyl optionally substituted in the 4- position with -aryl or -heteroaryl as defined above, (F-24)
(6) —$(CH_2)_m$—X_4, where m and X_4 are as defined above,
(7) —$(CH_2)_m$—$NR_{21\text{-}6}R_{21\text{-}8}$, where m, $R_{21\text{-}6}$ and $R_{21\text{-}8}$ are as defined above,
(8) —$(CHCH_3)_b$—$(CH_2)_f$—$R_{21\text{-}9}$, where b, f and $R_{21\text{-}9}$ are as defined above,

(C) R_{21A} and R_{21B} are taken together with the attached nitrogen atom to form a heterocyclic ring selected from the group consisting of
(1) 2-(carboxy)-1-pyrrolidinyl optionally as the C_1–C_3 alkyl ester or as a pharmaceutically acceptable salt, (F-27)
(2)2-(carboxy)-1-piperidinyl optionally as the C_1–C_3 alkyl ester or as a pharmaceutically acceptable salt, (F-28)
(3) 2-(carboxy)-1-hexamethyleneimino optionally as the C_1–C_3 alkyl ester or as a pharmaceutically acceptable salt, (F-29)
(4) 2-(carboxy)-1-heptamethyleneimino optionally as the C_1–C_3 alkyl ester or as a pharmaceutically acceptable salt, (F-30)
(5) 1-piperazinyl substituted in the 4- position with $R_{21\text{-}12}$—CO—$(CH_2)_j$— where $R_{21\text{-}12}$ is —heteroaryl, —$NR_{21\text{-}13}$heteroaryl and 2-furanyl, where $R_{21\text{-}13}$ is —H or C_1–C_3 alkyl, where j is 0 through 3 and aryl is as defined above, (F-31)
(6) 1-piperazinyl substituted in the 4- position with heteroaryl-$(CH_2)_f$, where heteroaryl and j are as defined above, (F-32)
(7) 1-piperazinyl substituted in the 4- position with aryl-$(CH_2)_f$, where aryl and j are as defined above, (F-33)
(8) 4-hydroxy-1-piperidinyl substituted in the 4- position with aryl as defined above, (F-34)
(9) 1-piperazinyl substituted in the 4- position with heteroaryl-$NR_{21\text{-}13}$-CO-$(CH_2)_f$, where heteroaryl, $R_{21\text{-}13}$ and i are as defined above; (F-35)

(D-II) R_{16} is α-$R_{16\text{-}3}$:β-$R_{16\text{-}4}$ where one of $R_{16\text{-}3}$ and $R_{16\text{-}4}$ is —H and the other is —H, —F, —CH_3 or —OH, and R_{17} is =CH—$(CH_2)_p$—$NR_{21A}R_{21B}$, where p is 1 or 2, where R_{21A} and R_{21B} are as defined above;

(D-III) R_{16} is α-$R_{16\text{-}5}$:β-$R_{16\text{-}6}$ and R_{17} is α-$R_{17\text{-}5}$:β-$R_{17\text{-}6}$, where $R_{16\text{-}5}$ is —H, —OH, —F or —CH_3 and $R_{16\text{-}6}$ is —H, —OH, —F, or —CH_3, with the proviso that at least one of $R_{16\text{-}5}$ and $R_{16\text{-}6}$ is —H, where $R_{17\text{-}5}$ is —H, —OH, —CH_3, —CH_2CH_3, C_2–C_7 alkanoyloxy or —O—CO—aryl, where aryl is as defined above, and $R_{17\text{-}6}$ is —C(=Z)—$(CH_2)_n$—$NR_{21A}R_{21B}$, where Z, n, R_{21A} and R_{21B} are as defined above;

(D-IV) the 16,17-acetonide of a compound where $R_{16\text{-}5}$ is —OH, $R_{16\text{-}6}$ is —H, $R_{17\text{-}5}$ is —OH and $R_{17\text{-}6}$ is —C(=Z)—$(CH_2)_n$—$NR_{21A}R_{21B}$, where Z, n, —R_{21A} and R_{21B} are as defined above;

(D-V) R_{16} is α-$R_{16\text{-}7}$:β-$R_{16\text{-}8}$ and R_{17} is α-C(=Z)—$(CH_2)_n$—N—$R_{21A}R_{21B}$:β-H where Z, n, R_{21A} and R_{21B} are as defined above, where $R_{16\text{-}7}$ is —H, —OH, —F or —CH_3 and $R_{16\text{-}8}$ is —H, —OH, —F, or —CH_3, with the proviso that at least one of $R_{16\text{-}5}$ and $R_{16\text{-}6}$ is —H

and pharmaceutically acceptable salts thereof,
and hydrates and solvates thereof.

4,996,319

-2-AMINO-4,6-DICHLORO-5-(2-CYANOMETHYL-2-AMINO-5(CYANOMETHYL)-4,6-DICHLORO PYRIMIDINE

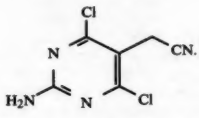
Thomas C. Malone, Canton, and Jagadish C. Sircar, Ann Arbor, both of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 354,312, Mar. 13, 1989, Pat. No. 4,921,858, which is a continuation of Ser. No. 002,727, Oct. 19, 1987, which is a continuation of Ser. No. 86,231, Aug. 20, 1987, abandoned, which is a continuation-in-part of Ser. No. 923,521, Oct. 24, 1986, abandoned. This application Feb. 1, 1990, Ser. No. 473,493

Int. Cl.[5] **C07D** *239/30, 239/42*

U.S. Cl. 544—330 **1 Claim**

1. A compound of the formula (X)



X

4,996,320

N-FLUOROPYRIDINIUM SALT AND PROCESS FOR PREPARING SAME

Teruo Umemoto; Kyoichi Tomita, both of Sagamihara; Kosuke Kawada, Hon, and Ginjiro Tomizawa, Wako, all of Japan, assignors to Sagami Chemical Research Center, Japan

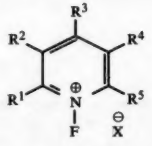
Continuation of Ser. No. 22,275, Mar. 5, 1987, abandoned, which is a continuation-in-part of Ser. No. 870,010, Jun. 3, 1986, abandoned. This application Jan. 9, 1989, Ser. No. 296,411

Claims priority, application Japan, Jun. 3, 1985, 60-118882; Mar. 7, 1986, 61-48450

Int. Cl.[5] **C07F** *9/58;* **C07D** *491/048, 219/04, 213/55*

U.S. Cl. 546—9 **5 Claims**

1. A N-fluoropyridinium salt having the general formula:



wherein:

(a) R^1 through R^5 are each a group selected from the class consisting of hydrogen, halogen, and methyl;

(b) when at least two of each of R^1 through R^5 are hydrogen, then the remaining one through three groups of R^1 through R^5 can each be selected from the class consisting of:
phenylcarbonyloxy substituted methyl,
a mixture of at least one fluoro substituted methyl group and at least one group selected from the class consisting of methyl, trifluoromethyl and halogen, and
tertiary butyl or a mixture of methyl and t-butyl provided that, when at least two of each of R^1 through R^5 are tertiary butyl, said tertiary butyl groups are not adjacent;

(c) when at least three of each of R^1 through R^5 are hydrogen, then the remaining one or two groups of R^1 through R^5 can each be selected from the class consisting of:
phenyl,
acetyl,
alkoxycarbonyl containing a total of 2 through 5 carbon atoms wherein said alkyl substituent contains a total of 1 through 4 carbon atoms,
nitro,
cyano,

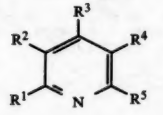
alkoxy containing 1 through 10 carbon atoms, and acyloxy wherein said acyl group contains 1 through 4 carbon atoms;

(d) when R^3 is hydrogen, then R^1 and R^2 taken together and R^4 and R^5 taken together can each form a six-membered carbocyclic ring which is inclusive of two adjacent carbon atoms of the pyridine ring; and

(e) when R^3 through R^5 are each hydrogen, then R^1 and R^2 taken together can form a five-membered heterocyclic ring which contains one oxygen atom, which is inclusive of two carbon atoms of the pyridine ring, and which has an oxo oxygen atom substituted on each ring carbon atom adjacent said ring oxy oxygen atom; and

(f) X is a conjugate base of a Brønsted acid except for halides.

3. A process for making an N-fluoropyridinium salt comprising reacting fluorine, a Brønsted acid containing a conjugate base except for haldies, and a pyridine compound in a reaction solvent, said pyridine compound having the general formula:



wherein:

(a) R^1 through R^5 are each a group selected from the class consisting of hydrogen, halogen, and methyl;

(b) when at least two of each of R^1 through R^5 are hydrogen, then the remaining one through three groups of R^1 through R^5 can each be selected from the class consisting of:

phenylcarbonyloxy substituted methyl,

a mixture of at least one fluoro substitutedmethyl group and at least one group selected from the class consisting of methyl, trifluoromethyl and halogen, and

alkyl containing two through four carbon atoms, provided that when each of two of R^1 through R^5 are tertiary butyl, said tertiary butyl groups are not adjacent; and

(c) when at least three of R^1 through R^5 are each hydrogen, then the remaining one or two groups of R^1 through R^5 can each be selected from the class consisting of:

phenyl,

acetyl,

alkoxycarbonyl containing a total of 2 through 4 carbon atoms wherein said alkyl substituent contains a total of 1 through 4 carbon atoms,

nitro,

cyano,

alkoxy containing 1 through 10 carbon atoms, and

acyloxy wherein said acyl group contains 1 through 4 carbon atoms;

(d) when R^3 is hydrogen, then R^1 and R^2 taken together and R^4 and R^5 taken together can each form a six-membered carbocyclic ring which is inclusive of two adjacent carbon atoms of the pyridine ring; and

(e) when R^3 through R^5 are each hydrogen, then R^1 and R^2 taken together can form a five-membered heterocyclic ring which contains one oxygen atom, which is inclusive of two carbon atoms of the pyridine ring, and which has an oxo oxygen atom substituted on each ring carbon atom adjacent said ring oxy oxygen atom.

4,996,321

DIBENZO[A,D]CYCLOHEPTENYLIDENE COMPOUNDS

John J. Baldwin, Gwynedd Valley, and David C. Remy, North Wales, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Feb. 26, 1990, Ser. No. 484,963

Int. Cl.[5] C07D *211/70*

U.S. Cl. 546—194 **1 Claim**

1. The compound which is:

4-amino-5-chloro-2-methoxy-N-((5-(1-methyl-4-piperidinylidene)-5H-dibenzo[a,d]cyclohepten-3-yl)-methyl)benzamide;

3,4,5-trimethoxy-N-((5-(1-methyl-4-piperidinylidene)-5H-dibenzo[a,d]cyclohepten-3-yl)methyl)benzamide; or

diethyl 1,4-dihydro-2,6-dimethyl-4-(5-(1-methyl-4-piperidinylidene)-5H-dibenzo-[a,d]cyclohepten-3-yl)-pyridinedicarboxylate

or pharmaceutically acceptable acid addition salt thereof.

4,996,322

SEPARATION OF AMIDES WITH MOLECULAR SIEVES

Ronald Pierantozzi, Orefield; Mildred A. Miller, N. Catasauqua; Mark L. Listemann, Whitehall; Thomas R. Gaffney, Allentown, and Charles G. Coe, Macungie, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed May 15, 1989, Ser. No. 351,987

Int. Cl.[5] C07C *233/03*

U.S. Cl. 564—216 **19 Claims**

1. A process for separating amides from each other which comprises forming a solution containing at least two amides of different molecular weights or different heats of adsorption wherein one amide has from 1 to 3 carbon atoms per molecule and a second amide has from 1 to 10 carbon atoms per molecule, contacting said solution with a molecular sieve selected from the group consisting of zeolites A, X, Y, chabazite, mordenite and mixtures thereof, having a preponderance of cations other than protons and having pore openings of a size sufficient to admit at least one of said amides, thereby selectively sorbing the amide having the lower molecular weight or the larger heat of adsorption.

4,996,323

PROCESS FOR THE PREPARATION OF 3,5,6-TRICHLOROPYRIDIN-2-OL

R. Garth Pews, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 12, 1989, Ser. No. 350,961

Int. Cl.[5] C07D *213/64*

U.S. Cl. 546—250 **10 Claims**

10. An improved process for the preparation of 3,5,6-trichloropyridin-2-ol which comprises the following steps:

(a) contacting trichloroacetyl chloride with acrylonitrile in the presence of a catalytic amount of copper or a cuprous salt to produce 2,2,4-trichloro-4-cyanobutanoyl chloride under reflux conditions to remove HCl;

(b) contacting the 2,2,4-trichloro-4-cyanobutanoyl chloride in an inert organic solvent with anhydrous HCl under pressure at a temperature from ambient to about 100° C. to cyclize the butanoyl chloride to 3,3,5,6-tetrachloro-3,4-dihydropyridin-2-one; and

(c) treating the 3,3,5,6-tetrachloro-3,4-dihydropyridin-2-one with chloride ion in an inert organic solvent to produce the 3,5,6-trichloropyridin-2-ol.

4,996,324

PREPARATION OF ALKANOLS WHICH ARE SUBSTITUTED IN THE 1 POSITION BY AROMATIC OR HETEROCYCLIC RADICALS

Kaspar Bott, Wachenheim; Herwig Hoffmann, Frankenthal; Walter Scheidmeir, Limburgerhof, and Horst Trapp, Plankstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

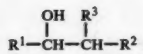
Continuation of Ser. No. 937,822, Dec. 4, 1986, abandoned. This application Oct. 26, 1988, Ser. No. 266,270

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1985, 3546016

Int. Cl.[5] C07D *213/28*; C07C *33/22, 33/34*

U.S. Cl. 546—339 **15 Claims**

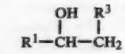
1. A process for the preparation of an alkanol of the formula



I

where R^1 is a member selected from the group consisting of phenyl, pyridyl and phenyl substituted by alkyl of 1 to 4 carbon atoms; R^2 is a straight-chain or branched alkyl of 1 to 15 carbon atoms and R^3 is hydrogen, methyl or ethyl, which process comprises:

reacting a secondary alcohol of the formula



II

with a primary alcohol of the formula R^2OH (III) where R^1, R^2 and R^3 have the above meanings, in the presence of an alkali metal hydroxide at from 150° to 300° C.

4,996,325

PESTICIDES

Haukur Kristinsson, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

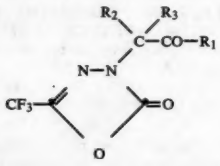
Division of Ser. No. 255,684, Oct. 11, 1988, Pat. No. 4,931,439. This application Mar. 13, 1990, Ser. No. 492,704

Claims priority, application Switzerland, Oct. 16, 1987, 4062/87

Int. Cl.[5] C07D *271/07*

U.S. Cl. 548—132 **4 Claims**

1. Compounds of formula IV



(IV)

wherein

R_1 is hydrogen, C_1–C_{12}alkyl, C_3–C_6cycloalkyl, C_1–C_4alkoxy-C_1–C_6alkyl, C_1–C_2haloalkyl, phenyl, benzyl, phenethyl, phenpropyl, phenbutyl or phenpentyl, or a phenyl, benzyl, phenethyl, phenpropyl, phenbutyl or phenpentyl radical that is mono- or di-substituted by halogen, C_1–C_5alkyl, C_1–C_2haloalkyl, methoxy and/or by ethoxy,

R_2 is hydrogen, C_1–C_6alkyl or C_3–C_6cycloalkyl, or is phenyl that is unsubstituted or substituted by C_1–C_{12}alkyl, halogen or by C_1–C_{12}haloalkyl, or R_1 and R_2 together form a saturated or unsaturated 3- to 7-membered carbocycle, and

R_3 is hydrogen or C_1–C_6alkyl.

4,996,326

2-(2-HYDROXYPHENYL)-BENZOTRIAZOLE DERIVATIVES, SUBSTITUTED BY BRANCHED LONG CHAIN ALKYL GROUPS CONTAINING ESTER MOIETIES

David G. Leppard, Marly; Mario Slongo, Taffers, and Jean Rody, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

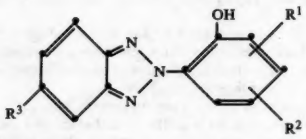
Continuation-in-part of Ser. No. 285,680, Dec. 16, 1988, abandoned. This application Jan. 12, 1990, Ser. No. 464,477

Claims priority, application Switzerland, Dec. 28, 1987, 5075/87

Int. Cl.[5] C07D *249/20*

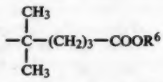
U.S. Cl. 548—261 **4 Claims**

1. A compound of formula I



I

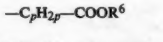
in which R^1 is located in the ortho-position or para-position relative to the OH group and is a group of formula IIa



IIa

in which R^6 is C_6–C_{18}-alkyl which is unsubstituted or substituted by —OH, C_9–C_{30}-alkyl or C_9–C_{30}-hydroxyalkyl each of which is interrupted by one or more —O— groups, or is C_6–C_{12}-cycloalkyl, C_2–C_{18}-alkenyl, C_7–C_{15}-aralkyl, glycidyl or furfuryl,

R^2 is C_1–C_{12}-alkyl, cyclohexyl or a group of formula IIa, or a group of formula IV



(IV)

in which p is 1 or 2, and

R^3 is hydrogen or chlorine.

4,996,327

PREPARATION OF PYRAZOLE AND ITS DERIVATIVES

Hans R. Merkle, Ludwigshafen, and Erich Fretschner, Neckarsteinach, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 7, 1990, Ser. No. 534,270

Claims priority, application Fed. Rep. of Germany, Jun. 10, 1989, 3918979

Int. Cl.[5] C07D *231/12*

U.S. Cl. 548—373 **5 Claims**

1. A process for the preparation of pyrazole

and its derivatives by dehydrogenation of 2-pyrazoline

or its derivatives, wherein the reaction is carried out using sulfuric acid in the presence of iodine or of an iodine compound at from 50° to 250° C.

4,996,328

BIS-(INDOLYL)ETHYLENES

Ponnampalam Mathiaparanam, Appleton, Wis., assignor to Appleton Papers Inc., Appleton, Wis.

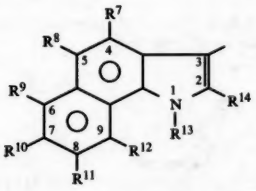
Filed Mar. 8, 1989, Ser. No. 320,642

Int. Cl.[5] C07D *209/14*

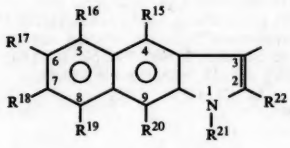
U.S. Cl. 548—427 **7 Claims**

1. Chromogenic bis-(indolyl)ethylene of the formula

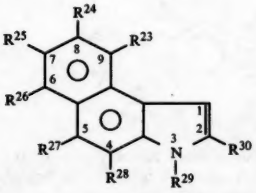
wherein each L^1 and L^2 is the same or different and is each independently selected from indole moieties (J2) through (J4),



(J2)



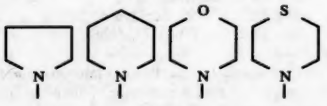
(J3)



(J4)

wherein in each of formulae (J2) through (J4) each of R^{13}, R^{14}, R^{21}, R^{22}, R^{29} and R^{30} need not be the same and is each independently selected from hydrogen, alkyl (C_1–C_8), cycloalkyl, aroxyalkyl, alkoxyalkyl, and aryl,

wherein each of R^7, R^8, R^9, R^{10}, R^{11}, R^{12}, R^{15}, R^{16}, R^{17}, R^{18}, R^{19}, R^{20}, R^{23}, R^{24}, R^{25}, R^{26}, R^{27} and R^{28} need not be the same and is independently selected from hydrogen, alkyl (C_1–C_8), cycloalkyl, aryl, halogen, alkoxy (C_1–C_8), aroxy, cycloalkoxy, dialkylamino including symmetrical and unsymmetrical alkyl groups with one to eight carbons, alkylcycloalkylamino, dicycloalkylamino,



wherein Z is selected from the group consisting of hydrogen, alkyl (C_1–C_8), aryl, aralkyl, aroxyalkyl, alkoxyalkyl and halogen.

4,996,329

DERIVATIVES OF 1,4-DIDEOXY-1,4-IMINO-D-MANNITOL AND A PROCESS FOR THEIR PREPARATION

George W. J. Fleet, Oxford; Bryan Winchester, London, and Neil M. Carpenter, Oxford, all of England, assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 424,628, Oct. 20, 1989. This application Jan. 8, 1990, Ser. No. 461,859

Int. Cl.[5] C07D *207/12*

U.S. Cl. 548—453 3 Claims

1. 6-Fluoro-1,4-imino-1,4,6-trideoxy-D-mannitol.

2. 6-Fluoro-1,4-imino-2,3-O-isopropylidene-1,4,6-trideoxy-D-mannitol.

3. A method for the synthesis of 6-fluoro-1,4-imino-1,4,6-trideoxy-D-mannitol of claim 1 comprising:

(a) Reacting 4,5-anhydro-1-azido-1-deoxy-2,3-O-isopropylidene-6-O-trifluoromethanesulfonyl-D-talitol with fluoride ion to give an epoxide derivative,

(b) catalytically hydrogenating the epoxide derivative to give a fluoride derivative, and

(c) removing the isopropylidene protecting group in the fluoride derivative to give 6-fluoro-1,4-imino-1,4,6-trideoxy-D-mannitol.

4,996,330

CHIRAL SUBSTITUTED TARTARIMIDES

Günter Scherowsky, Berlin, and Peter Schreiber, Berlin, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

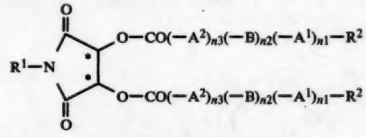
Filed Jun. 28, 1989, Ser. No. 373,179

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1988, 3822121

Int. Cl.[5] C07D *207/416*

U.S. Cl. 548—544 5 Claims

1. A chiral substituted tartaric acid derivative which is substituted by mesogenic radicals on the hydroxyl groups and has the formula (I)



(I)

in which

R^2 is linear (C_4–C_{12}) alkyl, it being possible for the CH_2 group bonding to the next radical to be replaced by O,

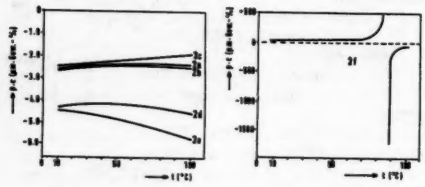
A^1 and A^2 independently of one another are 1,4-phenylene, diazine-2,5-diyl or 1,4-cyclohexylene,

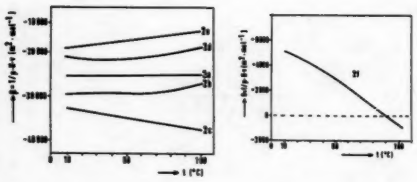
B is CO-O, C-CO, OCH_2 or CH_2O,

n1, n2, n3 independently of one another are zero or 1, n1 and n3 not being zero at the same time,

R^1 is linear (C_1–C_{12})-alkyl or R^3-(A^1-)$_{n1}$(A^2-)$_{n3}$ in which

R^3=H or R^2; A^1 and A^2=1,4-phenylene or 1,4-cyclohexylene and n1 and n3=zero or 1.





4,996,331

NOVEL BIPHENYL DERIVATIVE AND PREPARATION AND USE THEREOF

Masayuki Kimura; Kunio Hosaka; Shigehumi Takeda, and Hiroshi Mitsuhashi, all of Tokyo, Japan, assignors to Tsumura & Co., Tokyo, Japan

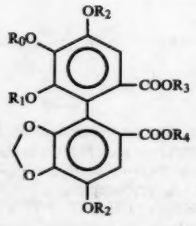
Division of Ser. No. 156,939, Jan. 19, 1988, Pat. No. 4,849,448. This application Apr. 24, 1989, Ser. No. 341,813

Claims priority, application Japan, May 27, 1986, 61-120129; Jun. 13, 1986, 61-136261; Sep. 30, 1986, 61-229767

Int. Cl.[5] C07D *317/64*

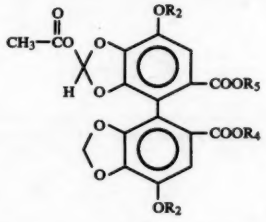
U.S. Cl. 549—229 4 Claims

1. A process for the preparation of a biphenyl derivative represented by the following formula (I):



(I)

in which R_0 and R_1 together form 0=C<, R_2 stands for an alkyl group having 1 to 3 carbon atoms, R_3 is a hydrogen atom and R_4 is a lower alkyl group, said process comprising reacting a compound represented by the following formula (II):



(II)

wherein R_2 stands for an alkyl group having 1 to 3 carbon atoms and R_4 stands for a lower alkyl group and R_5 stands for an alkyl group, with acetic acid.

4,996,332

OPTICAL INDICATOR COUMARINS AND METHODS FOR THEIR PREPARATION AND USE

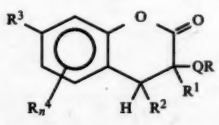
Robert T. Buckler, Edwardsburg, Mich., and Robert P. Hatch, Elkhart, Ind., assignors to Miles Inc., Elkhart, Ind.

Division of Ser. No. 540, Jan. 5, 1987, Pat. No. 4,778,893. This application Jun. 13, 1988, Ser. No. 205,732

Int. Cl.[5] C07D *311/02*

U.S. Cl. 549—285 15 Claims

1. A compound of the formula:



wherein Q is sulfur or selenium; R is alkyl or aryl; R^1 is hydrogen, cyano, carboxyl, alkyl, alkenyl, aryl, carboalkoxy, carboaryloxy, or carboxamide; R^2 is hydrogen, alkyl, alkenyl, or aryl; R^3 is —OR^5 where R^5 is hydrogen or lower alkyl, or —NR^6R^7 where R^6 and R^7, which can be the same or different, are hydrogen, alkyl, alkenyl, or aryl; n is an integer from 0 through 3; and R^4, which can be the same or different when n=2 or 3, is halo, alkyl, alkenyl, alkoxy, or aryl.

4,996,333

CONVERSION OF ACETIC ACID INTO DIKETENE AND WATER USING DIMETHYLSULFOXIDE AND PELARGONIC ACID

Lloyd Berg, 1314 S. Third Ave., Bozeman, Mont. 59715, assignor to Lloyd Berg, Bozeman, Mont.

Filed Jul. 23, 1990, Ser. No. 557,601

Int. Cl.[5] C07D *305/12*

U.S. Cl. 549—328 1 Claim

1. A method for converting acetic acid into diketene which comprises heating acetic acid in a mixture of dimethylsulfoxide and pelargonic acid for about a half hour at a temperature in the range of 120–150° C., distilling the resulting product to recover the diketene and the water as overhead products and recovering the dimethylsulfoxide, pelargonic acid and unconverted acetic acid from the stillpot.

4,996,334

SORBITOL DERIVATIVES

Mitsumasa Kaitoh, and Shoichiro Mori, both of Ibaraki, Japan, assignors to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Feb. 3, 1989, Ser. No. 305,646

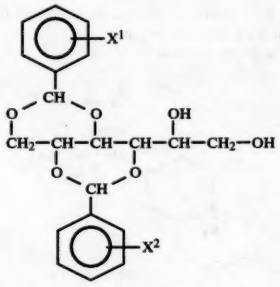
Claims priority, application Japan, Feb. 5, 1988, 63-25434; Jun. 10, 1988, 63-143059; Aug. 2, 1988, 63-193266

Int. Cl.[5] C07D *319/04*

U.S. Cl. 549—364 6 Claims

1. A dibenzylidenesorbitol derivative represented by the formula (I):

(I)



wherein one of X^1 and X^2 represents —$COOR^1$ and the remainder represents —$COOR^1$, or —$CONR^2R^3$, wherein R^1 represents a hydrocarbon group having 1 to 20 carbon atoms, and R^2 and R^3 are identical or different and each independently represents a hydrogen atom, and alkyl group, an aryl group or an aralkyl group.

4,996,335

SOFT STEROIDS HAVING ANTI-INFLAMMATORY ACTIVITY

Nicholas S. Bodor, 7211 SW. 97th La., Gainesville, Fla. 32608, assignor to Nicholas S. Bodor, Gainesville, Fla.

Continuation of Ser. No. 626,535, Jun. 29, 1984, abandoned, which is a continuation of Ser. No. 418,458, Sep. 15, 1982, abandoned, which is a continuation-in-part of Ser. No. 265,785, May 21, 1981, abandoned, which is a continuation-in-part of Ser. No. 168,453, Jul. 10, 1980, abandoned. This application Dec. 9, 1985, Ser. No. 807,034

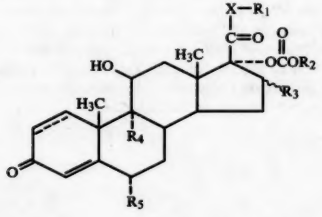
Int. Cl.[5] C07J *3/00;* A01N *43/50*

U.S. Cl. 552—610 113 Claims

1. A compound selected from the group consisting of:

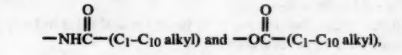
(a) a compound of the formula

(I)

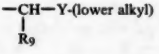


wherein:

R_1 is C_1–C_{10} alkyl; C_2–C_{10} (monohydroxy or polyhydroxy-)alkyl; C_1–C_{10} (monohalo or polyhalo)alkyl; or —CH_2COOR_6 wherein R_6 is unsubstituted or substituted C_1–C_{10} alkyl; C_3–C_8 cycloalkyl, C_3–C_8 cycloalkenyl or C_2–C_{10} alkenyl, the substituents being selected from the group consisting of halo, lower alkoxy, lower alkylthio, lower alkylsulfinyl, lower alkylsulfonyl,



or R_6 is unsubstituted or substituted phenyl or benzyl, the substituents being selected from the group consisting of lower alkyl, lower alkoxy, halo, carabamoyl, lower alkoxycarbonyl, lower alkanoyloxy, lower haloalkyl, mono(lower alkyl)amino, di(lower alkyl)amino, mono(lower alkyl)carbamoyl, di(lower alkyl)carbamoyl, lower alkylthio, lower alkylsulfinyl and lower alkylsulfonyl; or R_1 is —$CH_2CONR_7R_8$ wherein R_7 and R_8, which can be the same or different, are each hydrogen, lower alkyl, C_3–C_8 cycloalkyl, phenyl or benzyl, or R_7 and R_8 are combined such that —NR_7R_8 represents the residue of a saturated monocyclic secondary amine; or R_1 is unsubstituted or substituted phenyl or benzyl, the substituents being selected from the group of phenyl and benzyl substituents defined hereinabove with respect to R_6; or R_1 is

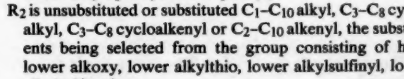


wherein Y is —S—, —SO—, —SO_2— or —O— and R_9 is hydrogen, lower alkyl or phenyl, or R_9 and the lower alkyl group adjacent to Y are combined so that R_1 is a cyclic system of the type

wherein Y is defined as above and the alkylene group contains 3 to 10 carbon atoms, of which at least 3 and no more than 6 are ring atoms; or R_1 is

wherein R_6 is defined as herein.above and R_{10} is hydrogen, lower alkyl, phenyl or halophenyl;

R_2 is unsubstituted or substituted C_1–C_{10} alkyl, C_3–C_8 cycloalkyl, C_3–C_8 cycloalkenyl or C_2–C_{10} alkenyl, the substituents being selected from the group consisting of halo, lower alkoxy, lower alkylthio, lower alkylsulfinyl, lower alkylsulfonyl,



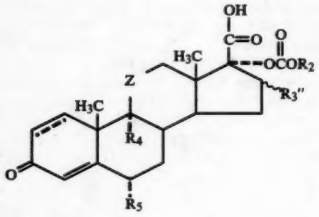
or R_2 is unsubstituted or substituted phenyl or benzyl, the substituents being selected from the group consisting of lower alkyl, lower alkoxy, halo, carbamoyl, lower alkoxycarbonyl, lower alkanoyloxy, lower haloalkyl, mono(-lower alkyl)amino, di(lower alkyl)amino, mono(lower alkyl)carbamoyl, di(lower alkyl)carbamoyl, lower alkylthio, lower alkylsulfinyl and lower alkylsulfonyl;

R_3 is hydrogen, α-hydroxy, β-hydroxy, α-methyl, β-methyl, $=CH_2$, or α- or

wherein R_2 is identical to R_2 as defined hereinabove;
R_4 is hydrogen, fluoro or chloro;
R_5 is hydrogen, fluoro, chloro or methyl;
X is —O— or —S—;
and the dotted line in ring A indicates that the 1,2 linkage is saturated or unsaturated;

(b) a quaternary ammonium salt of a compound of formula (I) wherein at least one of R_1 and R_2 is a halo-substituted alkyl group;

(c) a compound of the formula

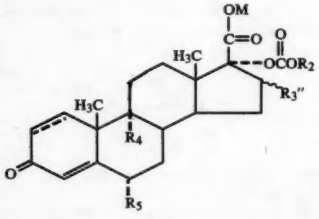


(III)

wherein R_2, R_4, R_5, and the dotted line in ring A are as defined in (a) above, Z is carbonyl or β-hydroxymethylene and R_3'' is hydrogen, α-methyl, β-methyl, $=CH_2$ or α- or

wherein R_2 is identical to R_2 above;

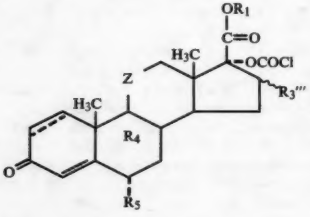
(d) a compound of the formula



(IV)

wherein M is alkali metal, thallium, alkaline earth metal/2 or NH_4 and R_2, R_3'', R_4, R_5, Z and the dotted line in ring A are as defined in (a) and (c) above;

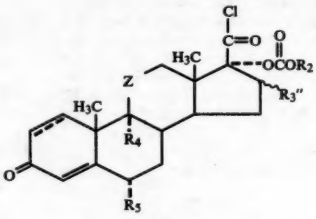
(e) a compound of the formula



(VII)

wherein R_3''' is hydrogen, α-methyl, β-methyl, α-OCOCl or β-OCOCl, and R_1, R_4, R_5, Z and the dotted line in ring A are as defined in (a) and (c) above;

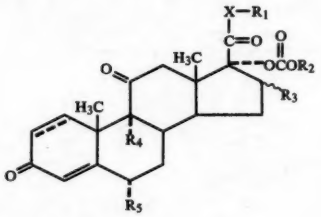
(f) a compound of the formula



(VIII)

wherein R_2, R_3'', R_4, R_5, Z and the dotted line in ring A are as defined in (a) and (c) above; and

(g) a compound of the formula



(IX)

wherein R_1, R_2, R_3, R_4, R_5, X and the dotted line in ring A are as defined in (a) above.

4,996,336

CROSS-LINKING TITANIUM & ZIRCONIUM CHELATES & THEIR USE

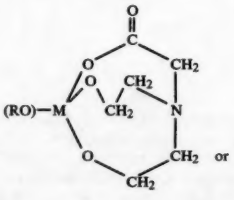
Donald E. Putzig, Newark, and Kenneth C. Smeltz, Wilmington, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 242,111, Nov. 9, 1988, abandoned, which is a division of Ser. No. 31,921, Mar. 10, 1987, Pat. No. 4,808,739. This application Nov. 28, 1989, Ser. No. 442,275

Int. Cl.[5] C07F *7/28, 7/00*

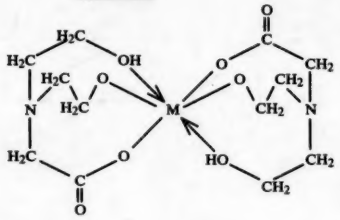
U.S. Cl. 556—55 **10 Claims**

1. A process for preparing a metal chelate which comprises reacting between one and two molar equivalents of N,N-bis-(2-hydroxyethyl)-glycine with a titanium halide, titanium oxyhalide, zirconium halide, zirconium oxyhalide, tetraalkoxy zirconate or a tetraalkoxy (2-hydroxyethyl)glycine/metal chelate which can be represented by the formula:



or

-continued



wherein R is H or alkyl of 1 to 12 carbon atoms and M is Ti or Zr.

4,996,337

SYNTHESIS OF CISPLATIN ANALOGS

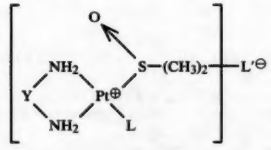
Panayota Bitha, Pomona; Joseph J. Hlavka, Tuxedo Park, and Yang-I Lin, Tappan, all of N.Y., assignors to American Cyanamid Company, Wayne, N.J.

Division of Ser. No. 281,376, Dec. 8, 1988, Pat. No. 4,937,358, which is a division of Ser. No. 65,441, Jun. 23, 1987, Pat. No. 4,808,730. This application Mar. 13, 1990, Ser. No. 493,043

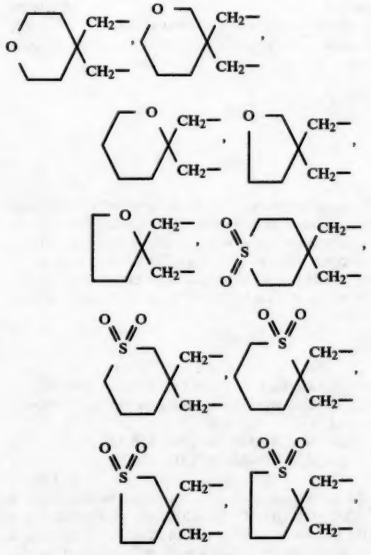
Int. Cl.[5] C07F *17/02*; A61K *31/555, 31/28*

U.S. Cl. 556—137 **2 Claims**

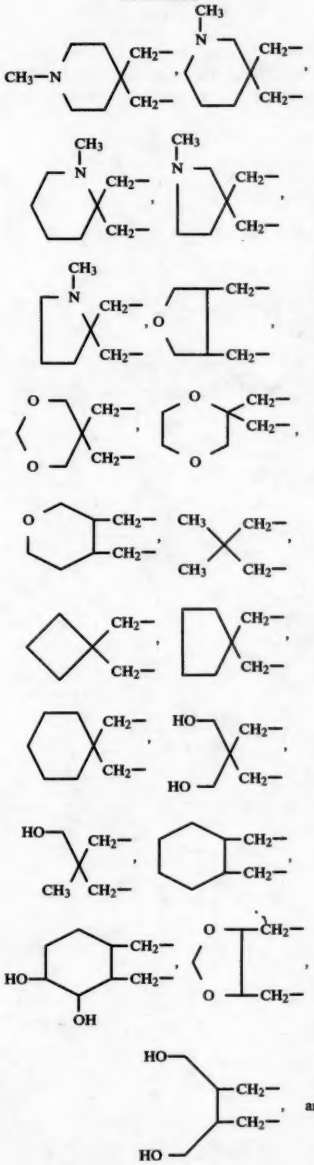
1. A compound of the formula:



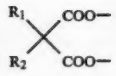
wherein Y is selected from the group consisting of



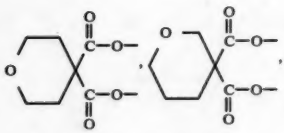
-continued

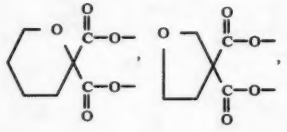


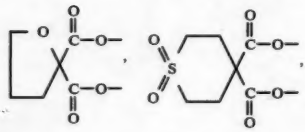
and L and L' are monobasic carboxylates selected from the group consisting of acetate, hydroxyacetate and propionate, or L and L' taken together are a dibasic carboxylate selected from the group consisting of

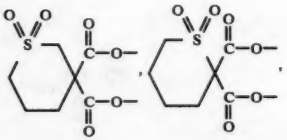


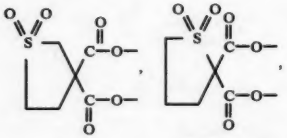
where R_1 and R_2 are hydrogen or lower alkyl(C_1–C_5) or R_1 and R_2 taken together is $-(CH_2)_n-$ where n is 2 to 5 and moieties of the structure:

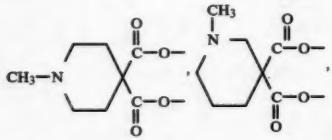


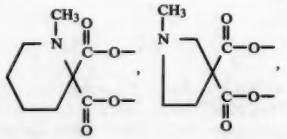




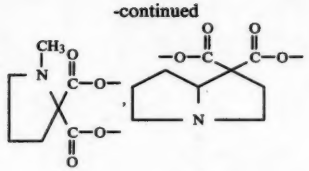




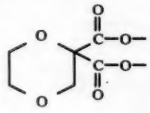




-continued



and



4,996,338

PROCESS FOR PREPARATION OF ALUMINOXANE

Hiroshi Maezawa, and Norio Tomotsu, both of Ichihara, Japan, assignors to Idemitsu Kosan Company Limited, Tokyo, Japan

Filed Jan. 29, 1990, Ser. No. 471,865
Claims priority, application Japan, Feb. 16, 1989, 1-35149
Int. Cl.[5] C07F *5/06*
U.S. Cl. 556—179 **17 Claims**

1. A process for preparing aluminoxane which comprises reacting an organoaluminum compound and water in a solvent having a higher boiling point than that of the organoaluminum compound, and condensing the resulting reaction mixture under atmospheric pressure or reduced pressure.

4,996,339

TONER FOR DEVELOPING ELECTROSTATIC LATENT IMAGES

Akihiro Tada, Osaka; Takashi Kiriu, Kyoto, and Motoomi Arakawa, Osaka, all of Japan, assignors to Orient Chemical Industries, Ltd., Osaka, Japan

Division of Ser. No. 206,472, Jun. 13, 1988, Pat. No. 4,855,208.
This application Jun. 6, 1989, Ser. No. 362,068
Claims priority, application Japan, Jul. 9, 1987, 62-172573
Int. Cl.[5] C07F *5/06*
U.S. Cl. 556—181 **18 Claims**

1. An aluminum compound of aromatic o-aminocarboxylic acid, the aromatic o-aminocarboxylic acid being represented by the formula

[I]

wherein Q is a benzene nucleus which is optionally substituted with at least one nuclear substituent or napthalene nucleus which is optionally substituted with at least one nuclear substituent, R is hydrogen, alkyl (C_1–C_{18}), aryl or nuclear substituted aryl (C_6–C_{18}), aralkyl or nuclear substituted aralkyl (C_7–C_{18}), or —COR′, wherein R′ is alkyl (C_1–C_8), aryl (C_6–C_8), alkoxy (C_1–C_8) or amino.

4,996,340

INTRAMOLECULAR MIGRATION REACTIONS

Joseph A. Miller, Santa Rosa, Calif., assignor to Ethyl Corporation, Richmond, Va.

Filed Nov. 8, 1989, Ser. No. 433,323
Int. Cl.[5] C07F *5/06*; C07C *2/76*
U.S. Cl. 556—190 **31 Claims**

1. A process for production of a compound of the formula $[RHC{=}CR'AlR'_2(OR'')]^-M^+$ in which the alkenyl group is predominantly (E) in structure, which comprises reacting a compound of the formula MOR″ with a compound of the

formula $[RHC{=}C(X)AlR'_3]^-M^+$ in which the alkenyl group is predominantly (E) in structure in a non-protonic polar solvent

wherein R, R' and R'' are the same or different and each is an inert carbon-bonded organic group; X is a halogen atom; and M is an alkali metal atom; such that one R' group undergoes 1,2-migration to the carbon atom of the alkenyl group.

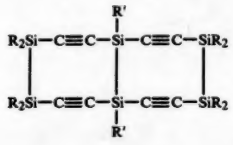
4,996,341

CONDENSED BICYCLIC DISILANYLENE-ACETYLENE COMPOUND AND METHOD FOR PREPARING THE SAME

Takahisa Iwahara, Kobe, Japan, and Robert C. West, Madison, Wis., assignors to Kanegafuchi Chemical Industry Co., Ltd., Japan

Filed Jul. 5, 1990, Ser. No. 548,231
Int. Cl.[5] C07F 7/08
U.S. Cl. 556—406 **21 Claims**

1. A condensed bicyclic disilanylene-acetylene compound having the following formula (II):



(II)

wherein R and R' are each a univalent hydrocarbon group having 1 to 20 carbon atoms.

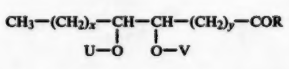
4,996,342

VICINAL DISUBSTITUTED CARBOXYLIC ACIDS AND SILYLATED DERIVATIVES

Ta Y. Ching, Novato, and Lon-Tang W. Lin, Vallejo, both of Calif., assignors to Henkel Research Corporation, Santa Rosa, Calif.

Filed Feb. 8, 1989, Ser. No. 308,786
Int. Cl.[5] C07F 7/08, 7/18
U.S. Cl. 556—437 **15 Claims**

1. A compound of the formula



(I)

wherein R is: (a) OH; (b) OM wherein M is a metal ion selected from the group consisting of Li^+, Na^+, K^+, Mg^{+2}, Ca^{+2}, or Ba^{+2}; (c) an alkoxyl, oralkenoxyl group having from 1 to 6 carbon atoms; (d) a polyethoxy group having the formula $O(CH_2CH_2O)_a$—H wherein a is an integer having a value of from 1 to 20; (e) $—NR^2R^3$ wherein R^2 is H, CH_3, $—CH_2CH_3$, $—CH_2CH_2OH$, $—CH_2CH_2N(CH_3)_2$, or $—(CH_2CH_2NH)_bH$ wherein b is an integer having a value of from 1 to 4, and R^3 is H, CH_3, $—CH_2CH_3$, $—CH_2CH_2OH$, $—CH_2CH_2N(CH_3)_2$; (f) $ON(R^9)_4$ wherein R^9 is hydrogen, $—CH_3$, $—CH_2CH_3$, $—CH_2CH_2OH$; U is hydrogen, or G—R_c wherein G is a bivalent radical derived from a linear or branched alkane or alkene having from 3 to 10 carbon atoms; R_c is (a) $Si(OR^5)_3$ wherein R^5 is an alkyl group having from 1 to 4 carbon atoms or (b) $Si(R^6)_3$ wherein R^6 is an alkyl group having from 1 to 3 carbon atoms; V is hydrogen, or G—R_c wherein G is a bivalent radical derived from an linear or branched alkane or alkene having from 3 to 10 carbon atoms; R_c is (a) $Si(OR^5)_3$ wherein R^5 is an alkyl group having from 1 to 4 carbon atoms or (b) $Si(R^6)_3$ wherein R^6 is an alkyl group having from 1 to 3 carbon atoms, with the proviso that [U or V is hydrogen] only one of U or V may be hydrogen; and wherein xi is an integer having a value of from 0 to 10 and y is an integer having a value of from 0 to 10.

4,996,343

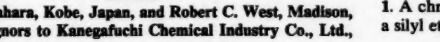
STABLE SILICA-BASED ETHER BONDED PHASES FOR BIOPOLYMER SEPARATIONS

Barry L. Karger, Chestnut Hill; Binyamin Feibush, Needham; Neil T. Miller, West Newton, and Alvaro Figueroa, Boston, all of Mass., assignors to Northeastern University, Boston, Mass.

Division of Ser. No. 609,272, May 11, 1984, Pat. No. 4,778,909.
This application Oct. 13, 1988, Ser. No. 257,740
Int. Cl.[5] C07F 7/08, 7/18
U.S. Cl. 556—445 **9 Claims**

1. A chromatographic packing material comprising:

a silyl ether compound having the formula



wherein

R is alkyl of from one to five carbons;

m is an integer from 2 to 5;

n is an integer from 1 to 5;

p is an integer from 0 to 10; and

a particulate silica-based chromatographic support;

said silyl ether being chemically bonded to said chromatographic support.

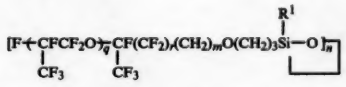
4,996,344

FLUORINE-CONTAINING ORGANOSILICON COMPOUND AND PROCESS FOR PREPARING THE SAME

Hiroshi Inomata, Takasaki; Hirofumi Kishita, Annaka, and Akira Yoshida, Tokyo, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Feb. 10, 1989, Ser. No. 308,466
Claims priority, application Japan, Feb. 12, 1988, 63-32474
Int. Cl.[5] C07F 7/08
U.S. Cl. 556—448 **4 Claims**

1. A fluorine-containing organosilicon compound having the formula (I):



(I)

wherein R' represents a monovalent hydrocarbon group having 1 to 10 carbon atoms, m is an integer of 0 to 2, n is an integer of 3 or 4, q is an integer of 1 or 2, and r is an integer of 0 or 1.

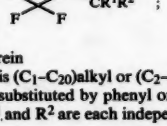
4,996,345

DIFLUOROKETONES FROM DIFLUOROACYLSILANES

Peter A. McCarthy, Pawcatuck, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Jun. 21, 1989, Ser. No. 369,161
Int. Cl.[5] C07F 7/18
U.S. Cl. 556—485 **15 Claims**

1. A silyl ether of the formula



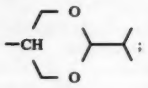
(IV)

wherein

R is (C_1–C_{20})alkyl or (C_2–C_{20})alkenyl, or one of said groups substituted by phenyl or (C_1–C_{20})alkoxyl;

R^1 and R^2 are each independently hydrogen, (C_1–C_{20})alkyl,

(C_2–C_{20})alkenyl, phenyl or (C_7–C_{20})phenylalkyl; or R^1 is hydrogen and R^2 is



and

R^3, R^4 and R^5 are each independently (C_1–C_{20})alkyl, (C_2–C_{20})alkenyl, phenyl or (C_7–C_{20})phenylalkyl;

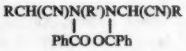
4,996,346

FORMATION OF ACYCLIC BIS (REISSERT COMPOUNDS)

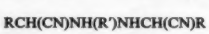
Harry W. Gibson, and Yajnanarayana H. R. Jois, both of Blacksburg, Va., assignors to Virginia Tech Intellectual Properties, Inc., Blacksburg, Va.

Filed Oct. 6, 1989, Ser. No. 418,365
Int. Cl.[5] C07C *255/29*
U.S. Cl. 558—392 **5 Claims**

1. A process for the formation of a bis Reissert compound of the formula



where R is alkyl, R′ is alkylene, and Ph is phenyl which comprises reaction of



with benzoyl chloride in the presence of pyridine as amine acid acceptor.

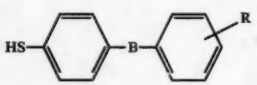
4,996,347

NOVEL BETA-D-PHENYLTHIOXYLOSIDES, THEIR METHOD OF PREPARATION AND THEIR USE AS THERAPEUTICS

Soth Samreth, Longvic; Francois Bellamy, Saulon La Chapelle, and Jean Millet, Saulon La Rue, all of France, assignors to Fournier Innovation et Synergie, Paris, France

Division of Ser. No. 185,422, Apr. 25, 1988, Pat. No. 4,877,808.
This application Jun. 27, 1989, Ser. No. 371,775
Claims priority, application France, May 4, 1987, 87 06237
Int. Cl.[5] C07C *321/26*
U.S. Cl. 558—411 **1 Claim**

1. A thiophenol compound selected from the group consisting of compounds that have formula:



(VII)

wherein

R is a NO_2 or CN group; and

B is a CH_2, CHOH, or CO group.

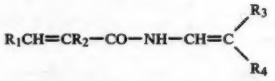
4,996,348

N-ALKENOYL ENAMIDES, THEIR PREPARATION AND THE USE THEREOF

Martin Kuhn, Dornach, Switzerland, and Philippe Ouziel, Riedisheim, France, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 19, 1988, Ser. No. 221,405
Claims priority, application Switzerland, Jul. 29, 1987, 2911/87
Int. Cl.[5] C07C *255/07, 255/09, 255/10, 255/34*
U.S. Cl. 558—445 **4 Claims**

1. A N-alkenoyl enamide of the formula



wherein

R_1 is hydrogen or methyl,

R_2 is hydrogen, C_1–C_4alkyl or halogen, and at least one of R_3 and R_4 is CO—R_5, benzoyl, phenyl or cyano, wherein

R_5 is C_1–C_4alkyl and

R_4 can also be hydrogen.

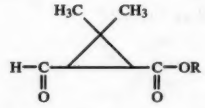
4,996,349

ENANTIOSELECTIVE PROCESS

Alain Krief, Wepion, and Willy Dumont, Salet, both of Belgium, assignors to Roussel Uclaf, Paris, France

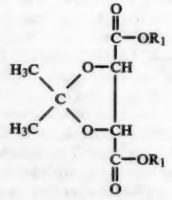
Continuation of Ser. No. 235,093, Aug. 22, 1988, abandoned.
This application Feb. 21, 1990, Ser. No. 482,647
Claims priority, application France, Aug. 24, 1987, 87 11849
Int. Cl.[5] C07C *69/74*
U.S. Cl. 560—124 **5 Claims**

1. A process for the preparation of racemates or optically active isomers of a compound of the formula



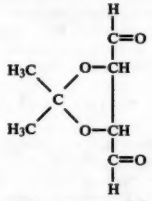
I

with cis or trans structures wherein R is selected from the group consisting of hydrogen, alkyl of 1 to 4 carbon atoms and aryl of 6 to 12 carbon atoms comprising reacting a diester of the formula



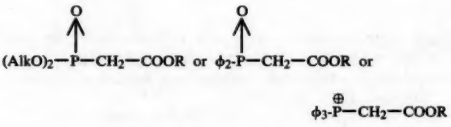
II

in racemic form or as resolved isomers wherein R_1 is selected from the group consisting of alkyl of 1 to 4 carbon atoms, aryl of 6 to 12 carbon atoms and aralkyl of 7 to 8 carbon atoms with a reducing agent to obtain a precursor of a compound of the formula

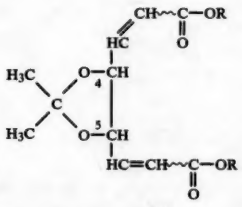


III

reacting the latter with a reagent of the formula



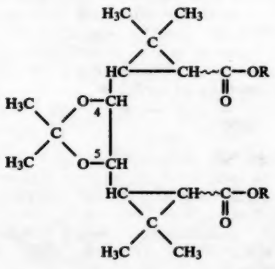
wherein R has the above definition, Alk is alkyl of 1 to 4 carbon atoms and ϕ is phenyl to obtain a compound of the formula



IV

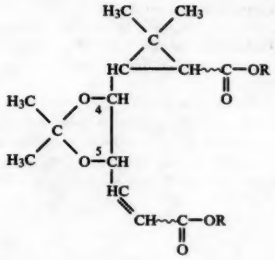
wherein R is as defined above and the wavy lines indicate the cis or trans configuration, reacting the latter with a gem-dimethyl cyclopropanation reagent of the formula

wherein X is $P(Ar)_3$, $S(Ar)_2$, or



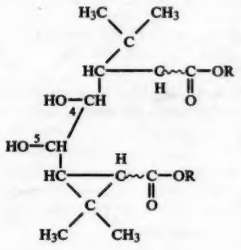
V

Ar is phenyl and R_2 is hydrogen or alkyl of 1 to 4 carbon atoms to obtain a compound of the formula



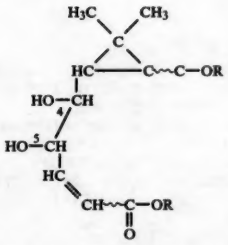
Va

or a compound of the formula



VI

or



VIa

wherein R and the wavy lines have the above definitions, optionally reacting the latter with a gem-dimethyl cyclopropanation agent to obtain the compound of formula V, the product of formula V or Va is either subjected to hydrolysis of the dioxolane group to obtain a compound respectively of the formula

wherein R and the wavy lines have the above definitions and then cleaving the 4,5-bond with an oxidizing agent to obtain a compound of formula I or simultaneously hydrolyzing the dioxolane group and cleaving the 4,5-bond with an oxidizing agent to obtain the compound of formula I.

4,996,350

METHOD FOR THE PREPARATION OF DIALKYL DICHLOROSUCCINATES

Albert A. Cevasco, Belle Mead, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 101,454, Oct. 1, 1987, abandoned. This application Nov. 17, 1989, Ser. No. 483,917

Int. Cl.[5] C07C *67/307, 69/63*

U.S. Cl. 560—192 6 Claims

1. A method for the preparation of dialkyl dichlorosuccinates, said method consisting essentially of reacting dialkyl maleate with chlorine in the presence of a catalytic amount of a C_1–C_4 alkyl alcohol at a temperature range of about 20° C. to 75° C. for sufficient period of time to complete said reaction.

4,996,351

PROCESS FOR REDUCING THE QUANTITY OF HYDROLYZABLE CHLORIDES IN ISOCYANATES

John L. Nafziger, and Mark J. Hazelrigg, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jan. 27, 1987, Ser. No. 7,317

Int. Cl.[5] C07C *249/00*

U.S. Cl. 560—352 4 Claims

1. A process for removing volatile impurities from a crude isocyanate compound which is prepared in the phosgenation of a primary amine, comprising heating said crude isocyanate compound to a temperature sufficient to volatilize said volatile impurities in the presence of an acidic material containing a plurality of strong acid groups, wherein the acidic material is an organic polymer which is coated onto or forms part of the packing of a distillation apparatus.

4,996,352

ENANTIOMERS OF β-[(2-AMINO-1-NAPHTHALENYL) THIOL]-α-HYDROXY-4-METHOXYBENZENE PROPANOIC ACID

Erno Mohacsi, Summit, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 192,252, May 10, 1988, Pat. No. 4,864,058. This application Jun. 29, 1989, Ser. No. 373,741

Int. Cl.[5] C07B *57/00;* C07C *323/30*

U.S. Cl. 562—401 2 Claims

1. The compound (+)-β-[(2-amino-1-naphthalenyl)thio]-α-hydroxy-4-methoxybenzenepropanoic acid in substantially optically pure form.

4,996,353

PROCESS FOR THE PREPARATION OF PARA,PARA'-POLYPHENYLDICARBOXYLIC ACID

Guo-shuh J. Lee; Kenneth A. Burdett, and Joseph J. Maj, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 16, 1989, Ser. No. 352,575

Int. Cl.[5] C07C *51/215*

U.S. Cl. 562—412 14 Claims

1. A process for the preparation of para,para'-polyphenyldicarboxylic acid which comprises contacting para,para'-diisoalkyl- or dialkyl-polyphenyl or an oxidation intermediate thereof with oxygen under reaction conditions sufficient to form para,para'-polyphenyldicarboxylic acid.

4,996,354

PREPARATION OF 2,4-DIHYDROXYBENZOIC ACID

Peter Neumann, Mannheim, and Ulrich Eichenauer, Frankfurt, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Sep. 1, 1989, Ser. No. 401,941

Claims priority, application Fed. Rep. of Germany, Sep. 21, 1988, 3832076

Int. Cl.[5] C07C *57/15*

U.S. Cl. 562—424 4 Claims

1. A process for preparing 2,4-dihydroxybenzoic acid in a solids mixer by reacting resorcinol with an alkali metal bicarbonate, alkali metal carbonate or a mixture thereof in a carbon dioxide atmosphere, which comprises using as the alkali metal bicarbonate or alkali metal carbonate a mixture of the corresponding sodium salts and 20–60% of the potassium salts.

4,996,355

NOVEL INTERMEDIATES FOR THE PRODUCTION OF 2,4,5-TRIFLUOROBENZOYL FLUORIDE

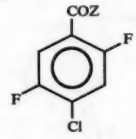
Narayanasamy Gurusamy, Ballwin, Mo., assignor to Mallinckrodt, Inc., St. Louis, Mo.

Filed Apr. 14, 1989, Ser. No. 338,162

Int. Cl.[5] C07C *63/04*

U.S. Cl. 562—493 7 Claims

1. A compound of the formula



wherein Z is OH, Cl or F.

4,996,356

CARBOXYLIC ACIDS AND METHODS OF PREPARING THE SAME

Hiroshi Takahashi, Uji; Atushi Ohta, Kyoto, and Sayumi Akasaki, Uji, all of Japan, assignors to Sanyo Chemical Industries, Ltd., Kyoto, Japan

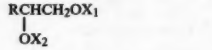
Filed May 6, 1988, Ser. No. 190,851

Claims priority, application Japan, May 13, 1987, 62-116399; May 13, 1987, 62-116400

Int. Cl.[5] C07C *59/10*

U.S. Cl. 562—587 3 Claims

1. Carboxylic acids represented by the general formula:



(I)

wherein R is a linear or granched alkyl or alkenyl group containing from 8 to 16 carbon atoms; one of X_1 and X_2 is a $-(CH_2)_n-COOM$ group, and the other is a hydrogen atom; M is a hydrogen atom, an alkali metal, an alkaline earth metal, ammonium, a lower alkanol amine cation, a lower alkylamine cation or a basic amino acid cation; and n is 1 or 2.

4,996,357

PROCESS FOR PREPARING ACETIC ACID

Hidetaka Kojima, and Takaaki Fujiwa, both of Himeji, Japan, assignors to Daicel Chemical Industries, Ltd., Osaka, Japan

Filed Mar. 29, 1985, Ser. No. 717,629

Claims priority, application Japan, Apr. 5, 1984, 59-68212

Int. Cl.[5] C07C *51/12, 51/353, 53/08*

U.S. Cl. 562—607 13 Claims

1. A process for preparing acetic acid from a starting material selected from the group consisting of (i) methyl formate

and (ii) a mixture of formic acid and a methyl carboxylate, which comprises: heating said starting material in the presence of (1) carbon monoxide, (2) a metal accelerator selected from the group consisting of beryllium, metals belonging to groups IIIA, IVB, VB and actinide metals, (3) a rhodium catalyst and (4) an iodine compound, under conditions effective to convert said starting material to acetic acid.

4,996,358

HYDROXYLAMINE BEARING AMINO ACID DERIVATIVES AS COLLAGENASE INHIBITORS

Balraj K. Handa, Welwyn Garden City; William H. Johnson, Hitchin, and Peter J. Machin, London, all of England, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

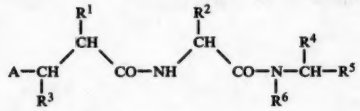
Continuation of Ser. No. 14,957, Feb. 17, 1987, abandoned. This application Apr. 11, 1989, Ser. No. 336,264

Claims priority, application United Kingdom, Mar. 11, 1986, 8605977; Dec. 12, 1986, 8629712

Int. Cl.[5] A61K *31/16, 31/85;* C07C *259/04, 259/06*

U.S. Cl. 562—621 36 Claims

1. A compound of the formula



I

wherein

A is a group of the formula HN (OH)—CO— or HCO—N-(OH)—;

R^1 is C_2–C_5-alkyl;

R^2 is isoproyl, isobutyl, benzyl, p-hydroxybenzyl, p-methoxybenzyl, hydroxymethyl, 1-hydroxyethyl, protected hydroxymethyl or 1-hydroxyethyl, mercaptomethyl, protected mercaptomethyl, 2-(methylthio) ethyl, carboxymethyl, 2-carboxyethyl, protected carboxymethyl or 2-carboxyethyl, 3-quanidinoproyl, 4-aminobutyl or protected 3-quanidinopropyl or 4-aminobutyl;

R^3 is hydrogen, amino, hydroxy, mercapto, C_1–C_6-alkyl, C_1–C_6-alkyl, C_1–C_6-alkylamino, C_1–C_6-alkylthio, aryl-(C_1–C_6), amino-(C_1–C_6-alkyl), protected amino-(C_1–C_6-alkyl), hydroxy-(C_1–C_6-alkyl), protected hydroxy-(C_1–C_6-alkyl), mercapto-(C_1–C_6alkyl), protected mercapto-(C_1–C_6-alkyl), carboxy-(C_1–C_6-alkyl) or protected carboxy-(C_1–C_6-alkyl);

R^4 is hydrogen or methyl;

R^5 is C_1–C_6-alkoxy-C_1–C_6-alkyl, di (C_1–C_6-alkoxy)-methylene, carboxyl, (C_1–C_6-alkyl)carbonyl, (C_1–C_6-alkoxy)-carbonyl, arylmethy oxycarbonyl, (C_1–C_6-alkyl-)aminocarbonyl or arylaminocarbonyl group; and

R^6 is hydrogen or methyl or

R^2 and R^4 together represent a group of the formula $—(CH_2)_n$ in which n stands for a number from 4 to 11; or

R^4 and R^6 together represent trimethylene; or a pharmaceutically acceptable salt of a compound which is acidic or basic, and wherein the hydroxy protecting group is selected from the group consisting of tert.butyl, benzyl and tetrahydropyranyl;

the mercapto protecting group is selected from the group consisting of tert.butyl and benzyl;

the amino protecting group is selected from the group consisting of tert.butoxycarbonyl, benzyloxycarbonyl, formyl, trityl, trifluoroacetyl, 2-(biphenylyl)-isopropoxycarbonyl isobornyloxycarbonyl and an acyl group derived from phthalic acid, terephthalic acid, glycine or alanine;

the protected carboxy group is a carboxy group protected in the form of a methyl, ethyl, tert.butyl or benzyl ester or in the form of an amide, N-(C_1–C_6-alkyl)amine, N,N-di(C_1–C_6-alkyl) amide, N-arylamide, N-(carboxymethyl)amide or N-(1-carboxyethyl) amide; and

aryl is selected from the group consisting of unsubstituted phenyl and phenyl substituted with one or more substituents selected from the group consisting of C_1–C_6-alkyl, C_1–C_6-alkoxy, halogen and trifluoromethyl.

4,996,359

PROCESS FOR THE PREPARATION OF AROMATIC BIS DIALKYL UREAS

Haven S. Kesling, Jr., Drexel Hill; Edward T. Shawl, Wallingford, and John G. Zajacek, Devon, all of Pa., assignors to Arco Chemical Technology, Inc., Wilmington, Del.

Filed Mar. 14, 1988, Ser. No. 167,922

Int. Cl.[5] C07C *275/40, 273/18*

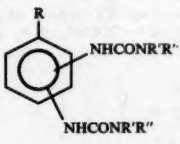
U.S. Cl. 564—50 11 Claims

1. A process for the preparation of aromatic bis dialkyl ureas comprising:

(a) reacting one or more aromatic diamines having the formula:

with isocyanic acid at a temperature of from about −30° C. to about 200° C. in the presence of an inert solvent to convert said aromatic diamines to one or more aromatic bis ureas having the formula:

(b) reacting said aromatic bis ureas with a dialkyl amine having the formula HNR′R″ at a temperature of from about 50° C. to about 200° C. in an inert solvent to produce one or more aromatic bis dialkyl ureas of the formula:



where R is hydrogen, an alkyl group having from 1 to 10 carbons, a halogen, an ether group, or a nitro group, and R′ and R″ are alkyl groups independently having from 1 to 8 carbons corresponding to R′ and R″ of said dialkylamine.

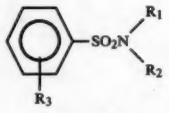
4,996,360

PREPARATION OF ARYLSULFONYL (ALKYL) AMIDES

Raymond Commandeur, Vizille, and Elie Ghenassia, Grenoble, both of France, assignors to Atochem, Puteaux, France

Filed Mar. 15, 1989, Ser. No. 323,857
Claims priority, application France, Mar. 17, 1988, 8803477
Int. Cl.[5] C07C 303/38
U.S. Cl. 564—90 10 Claims

1. A process for the preparation of an arylsulfonyl(alkyl)amide having the formula:



wherein R_1 is a hydrogen atom or an alkyl radical having from 1 to 10 carbon atoms, R_2 is an alkyl radical having from 1 to 10 carbon atoms, and R_3 is one or more hydrogen atoms or halogen atoms or lower alkyl substituents, comprising (a) intimately contacting an arylsulfonyl halide with a stoichiometric excess of both an alkylamine and an alkaline agent, said alkaline agent being present in aqueous solution, (b) eliminating water and excess alkylamine from the organic phase produced in stage (a) by distillation conducted at a temperature from 130° to 170° C., and (c) separating final product arylsulfonyl(alkyl)amide from the residual organic phase remaining after stage (b).

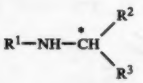
4,996,361

PROCESS FOR THE PREPARATION OF OPTICALLY ACTIVE SECONDARY ARYLAMINES

William R. Cullen, Vancouver, Canada; Michael D. Fryzuk, Kaiserslautern, Fed. Rep. of Germany; Brian R. James, Vancouver, Canada; Guo-Jun Kang, Vancouver, Canada; James P. Kutney, Vancouver, Canada; Roberto Spogliarich, Trieste, Italy, and Ian S. Thorburn, Vancouver, Canada, assignors to The University of British Columbia, Vancouver, Canada

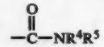
Filed Jul. 30, 1987, Ser. No. 79,625
Int. Cl.[5] C07C 57/00
U.S. Cl. 564—304 12 Claims

1. A process for the preparation of optically active secondary N-arylamines of the formula I

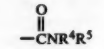


(I),

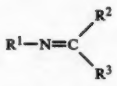
in which R^1 is C_6–C_{12}-aryl or C_4–C_{11}-heteroaryl which is attached via a ring C atom and contains 1 to 2 ring hetero atoms which can be substituted by C_1–C_{12}-alkyl, C_1–C_{12}-alkoxy, C_1–C_{12}-alkylthio, C_1–C_6-halogenoalkyl, halogen, —OH, —CN, C_6–C_{12}-aryl, C_6–C_{12}-aryloxy, C_6–C_{12}-arylthio or C_7–C_{16}-aralkyl, C_7–C_{16}-aralkoxy or C_7–C_{16}-aralkylthio, the aryl moieties of which radicals in turn may be substituted by C_1–C_4-alkyl, C_1–C_4-alkoxy, C_1–C_4-alkylthio, halogen, —OH, —CN, —$CONR^4R^5$ or —$COOR^4$, or by secondary amino having 2 to 24 C atoms,



or —$COOR^4$, R^4 and R^5 independently of one another being C_1–C_{12}-alkyl, phenyl or benzyl or R^4 and R^5 together being tetramethylene or pentamethylene or 3-oxapentylene; R^2 and R^3 are different from one another and are C_1–C_{12}-alkyl or cycloalkyl having 3–8 ring C atoms which are unsubstituted or substituted by —OH, —CN, halogen, C_1–C_{12}-alkoxy, phenoxy, benzyloxy, secondary amino having 2 to 24 C atoms,

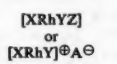


or —$COOR^4$, or are C_6–C_{12}-aryl or C_7–C_{16}-aralykl which are unsubstituted or substituted like R^1, or are or —$CONR^4R^5$ or —$COOR^4$ in which R^4 and R^5 are as defined above; or R_1 is as defined above and R^2 and R^3 together are alkylene which has 2 to 5 C atoms and which can be interrupted by i 1 or 2 —O—, —S— or —NR^4- groups and/or can be substituted by =O or substituted as above for R^2 and R^3 when they are alkyl, and/or is fused with benzene, furan, thiophene or pyrrole, or R^2 is as defined above and R^3 is alkylene which has 2 to 5 C atoms and is attached to R^1 and can be interrupted by 1 or 2 —O—, —S— or -NR^4- groups, and/or can be substituted by =O or substituted as above for R^2 and R^3 when they are alkyl, and/or is fused with benzene, furan, thiophene or pyrrole, and * means predominantly the R-configuration or S-configuration, by asymmetrically catalyzed hydrogenation of N-arylated, prochiral ketimines of the formula II



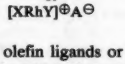
(II)

in which R^1, R^2 and R^3 are as defined above, in the presence of complex salts of a noble metal containing chiral ligands, which comprises carrying out the hydrogenation at a temperature from −40 to 80° C. and under hydrogen pressure of 10^6 Pa to 10^8 Pa and adding to the reaction mixture catalytic amounts of a rhodium compound of the formula III or IIIa



(III)

or



(IIIa)

in which X is two olefin ligands or one diene ligand, Y is a chiral diphosphine in which the secondary phosphine groups are linked by 2–4 C atoms and which, together with the Rh atom, forms a 5-membered, 6-membered or 7-membered ring, or Y is a chiral disphosphinite in which the phosphinite groups are linked via 2 C atoms and which, together with the Rh atom, forms a 7-membered ring, Z is Cl, Br or I and $A\ominus$ is the anion of an oxygen acid or complex acid.

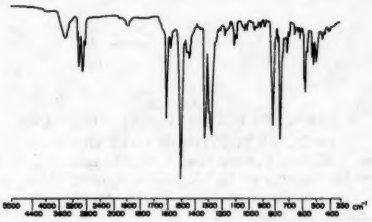
4,996,362

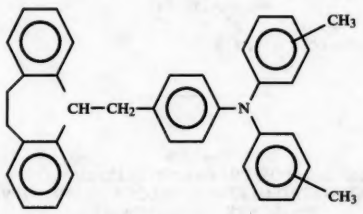
5-[(4-N,N-DITOLYLAMINO)BENZYL]-5H-DIBENZO[A,D]-CYCLOHEPTANE DERIVATIVES

Masaomi Sasaki, Susono, and Tamotsu Aruga, Mishima, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed May 3, 1990, Ser. No. 520,066
Claims priority, application Japan, May 31, 1989, 1-140106
Int. Cl.[5] C07C 211/54
U.S. Cl. 564—315 2 Claims

1. 5-[(4-N, N-ditolylamino)benzyl]-5H-dibenzo[a,d]-cycloheptane derivatives having formula (I):





4,996,363
CATALYTIC REFORMING OF ALKYLENEAMINES TO LINEARLY-EXTENDED POLYALKYLENEPOLYAMINES

Robert G. Bowman; David C. Molzahn, and George E. Hartwell, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 20, 1988, Ser. No. 287,189

Int. Cl.[5] C07C *209/64, 211/14*; C07D *295/13, 295/023*

U.S. Cl. 564—470 **23 Claims**

1. A process of reforming amines comprising contacting an alkyleneamine or mixture thereof with a catalytic amount of a catalyst consisting essentially of a Group IIA metal silicate, with the proviso that the silicate is essentially free of aluminum, the contacting occurring under reaction conditions such that a mixture of polyalkylenepolyamines is formed which is enriched in linearly-extended homologues.

4,996,364
USE OF ALKALINE EARTH SALTS OF POLYCARBOXYLIC ACID MONOESTERS AS ALKOXYLATION CATALYSTS

Ansgar Behler, Bottrop, and Uwe Ploog, Haan, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Apr. 11, 1989, Ser. No. 336,157

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1988, 3812168

Int. Cl.[5] C07C *213/00*

U.S. Cl. 564—475 **8 Claims**

1. The process of ethoxylating or propoxylating a compound containing an active hydrogen atom, said compound being selected from a fatty alcohol, fatty amine, and an amine which on ethoxylation or propoxylation forms a nonionic surfactant, comprising contacting said compound with an alkaline earth salt of a polycarboxylic acid monoester corresponding to general formula I

$$[R—(OC_mH_{2m})_n—O—CO—A(COO^-)_o]_p\,M^{2+} \quad (I)$$

in which

R is a radical selected from the group consisting of a linear or branched C_1–C_{22} alkyl or C_3–C_{22} alkenyl, phenyl, alkylphenyl containing to 3 C_1–C_{15} alkyl groups, benzyl and phenethyl,

A is a saturated or unsaturated, acyclic or cyclic C_2–C_6 hydrocarbon radical with two or three bonds or a benzene group with two or three bonds,

M is an alkaline earth metal selected from the group consisting of Ca, Ba and Sr;

m is the number 2 or 3;

n is a number from about 1 to about 20;

o is the number 1 and p is the number 2, or o is the number 2 and p is the number 1.

4,996,365
PREPARATION OF ALKYL-SUBSTITUTED CINNAMALDEHYDES

Gerald Lauterbach; Frank F. Pape, both of Ludwigshafen, and Walter Gramlich, Heidelberg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshaften, Fed. Rep. of Germany

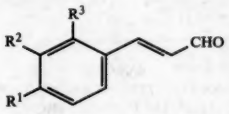
Filed Aug. 31, 1989, Ser. No. 401,241

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1988, 3831713

Int. Cl.[5] C07C *45/00*

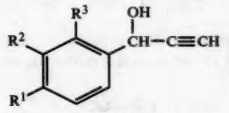
U.S. Cl. 568—427 **2 Claims**

1. A process for preparing an alkyl-substituted cinnamaldehyde of the formula I



(I)

where one or more of R^1, R^2 and R^3 is alkyl of from 1 to 8 carbon atoms and non-alkyl R^1, R^2 and R^3 are each hydrogen, which comprises refluxing a mixture of an acetylene alcohol of the general formula II



where R^1, R^2 and R^3 are each as defined above, and from 55 to 98% strength aqueous formic acid.

4,996,366
PROCESS FOR THE CATALYTIC HYDROFORMYLATION OF OLEFINS

Laura Tinucci, Cervignano D'Adda, and Edoardo Platone, Asti, both of Italy, assignors to Enitricerche S.p.A, Milan, Italy

Filed Jan. 23, 1990, Ser. No. 468,855

Claims priority, application Italy, Jan. 27, 1989, 19225 A/89

Int. Cl.[5] C07C *45/50*

U.S. Cl. 568—454 **17 Claims**

1. Process for the catalytic hydroformylation of olefins to produce aldehydes and/or alcohols by means of the reaction of linear or branched alpha-olefins or internal olefins of from 5 to 24 carbon atoms with hydrogen and carbon monoxide, which process is carried out by operating at a temperature ranging from 70° to 150° C. and at a pressure ranging from 3 to 100 bar in a liquid, aqueous-organic reaction medium, in the presence of a water-soluble complex catalyst containing a metal active in the hydroformylation selected from the group consisting of cobalt, ruthenium, rhodium, palladium, osmium, iridium and platinum, characterized in that said aqueous-organic medium is, during at least a substantial portion of the hydroformylation reaction time, in the form of a microemulsion containing an oil

phase, an aqueous phase, a surfactant and a co-surfactant, with said oil phase constituting the external phase and said aqueous phase constituting the internal phase of said microemulsion.

4,996,367

PROCESS FOR MAKING 4,4'-DIHYDROXYDIPHENYL SULFONE

Andreas B. Ernst, Glen Ellyn, and Gunter Caspari, Wheaton, both of Ill., assignors to Amoco Corporation, Chicago, Ill.

Filed Dec. 20, 1989, Ser. No. 453,664

Int. Cl.⁵ C07C ***315/00***

U.S. Cl. 568—33 **5 Claims**

1. A batch process to produce a dihydroxydiphenyl sulfone product from phenol and concentrated sulfuric acid in greater than 95 wt. % yield based upon said sulfuric acid, said product containing at least 90 wt. % of the 4,4'-dihydroxydiphenyl sulfone isomer, comprising:

reaction of said sulfuric acid and said phenol in an organic solvent mixture containing a lower-boiling and a higher-boiling hydrocarbon, said phenol and said sulfuric acid being employed in a mol ratio of about 2 to 1;

removal of reaction-produced water, hydrocarbon, and phenol from said reaction by azeotropic distillation and the formation of a condensed phase therefrom which separates into at least two immiscible layers, one layer of which is rich in phenol; and

return of at least the rich-in-phenol layer to said reaction at a rate which keeps the mol ratio of phenol to sulfuric acid in the reaction at least 2 to 1.

4,996,368

PROCESS FOR THE PURIFICATION AND STABILIZATION OF PERFLUOROPOLYETHERS

Thomas Gries, Frankfurt am Main, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 29, 1990, Ser. No. 471,867

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1989, 3902803

Int. Cl.⁵ C07C ***41/34***

U.S. Cl. 568—601 **11 Claims**

1. A process for the stabilization and purification of a perfluoropolyether of the general formulae (I) or (II)

$$R[CF_2O\underset{CF_3}{\underset{|}{C}}F]_n[\underset{CF_3}{\underset{|}{C}}FOCF_2]_mR' \qquad (I)$$

in which

R=—F or —C_aF_{2a+1}

R'=—F or —C_bF_{2b+1}

n,m=0,1, . . . or 12, n being identical with or different from m, $1 \leq n+m \leq 15$

a,b=1,2, . . . or 10, a being identical with or different from b

$$R''O[C_3F_6O]_c[C_2F_4O]_d[CFXO]_eR''' \qquad (II)$$

in which

R''=—C_fF_{2f+1}

R'''=—C_gF_{2g+1}

X=—F or —CF_3

c,d,e=integers such that the molecular weight of the perfluoropolyether is between 200 and 2000, where c, d and e may be identical or different and the units $[C_3F_6O]_c$, $[C_2F_4O]_d$, and $[CFXO]_8$ may be randomly distributed along the molecular chain of the perfluoropolyether,

or of mixtures of perfluoropolyethers of this type, which comprises heating the perfluoropol-yether or mixtures thereof to 150°-360° C. in the presence of a catalyst which contains one or more elements of the groups IA, IIA, IIIA, IVA or IVB of the periodic table or compounds thereof.

4,996,369

PERFLUORINATED POLYETHERS AND PROCESS FOR THEIR PREPARATION

Dennis J. Kalota, Fenton; John S. McConaghy, Jr., St. Louis; Paul W. Foerst; Paul H. Liu, both of Chesterfield, all of Mo., and Frank R. Feher, Jr., Belleville, Ill., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 150,963, Jan. 29, 1989. This application May 23, 1990, Ser. No. 498,057

Int. Cl.⁵ C07C ***43/11***

U.S. Cl. 568—615 **1 Claim**

1. Perfluoroheptaglyme dimer.

4,996,370

PROCESS FOR PREPARING FLUORINATED CONJUGATED OLEFINIC PRODUCTS AND NEW PRODUCTS THUS OBTAINED

Antonio Marraccini, Dormelletto; Antonio Pasquale, and Tiziana Fiorani, both of Novara, all of Italy, assignors to Ausimont S.r.l., Milan, Italy

Division of Ser. No. 372,828, Jun. 29, 1989, Pat. No. 4,947,006. This application Apr. 3, 1990, Ser. No. 503,742

Claims priority, application Italy, Jun. 30, 1988, 22162 A/88

Int. Cl.⁵ C07C ***43/15, 43/17***

U.S. Cl. 568—674 **7 Claims**

1. New fluorinated conjugated olefinic products having the formula:

$$R_xO-(CF|CF)_m-OR_x \qquad B$$

wherein:

R_x is either a linear or branched perhalogenated alkyl radical, a perhaloalkyl-monoether radical or a perhaloalkyl-polyether radical containing from 1 to 10 carbon atoms and containing halogen atoms selected from the group consisting of fluorine atoms or fluorine and chlorine atoms, and

m is a numeral within the range of from 2 to 10.

4,996,371

METHOD FOR FLUORODECARBOXYLATION

Donald F. Halpern, Fanwood, N.J., and Mark L. Robin, W. Laffayette, Ind., assignors to BOC, Inc., Murray Hill, New Providence, N.J.

Filed Jan. 16, 1990, Ser. No. 464,834

Int. Cl.⁵ C07C ***41/01, 17/33***

U.S. Cl. 568—683 **20 Claims**

1. A method for replacing a carboxylic acid group with a fluorine group in a halogenated aliphatic carboxylic acid compound having the formula, R-COOH, to prepare a fluorinated product having the formula, R-F, wherein R is a halogenated aliphatic group including straight- and branched-chain aliphatic groups selected from the group consisting of halogenated aliphatic and alkoxy-substituted halogenated aliphatic groups, wherein the method comprises the steps of:

(a) reacting the halogenated aliphatic carboxylic acid compound with bromine trifluoride; and

(b) recovering the fluorinated product.

4,996,372

PROCESS FOR OXIDIZING 2,6-DIISOPROPYLNAPHTHALENE

Kenji Saeki, Ohtake; Hiroshi Fukuhara, Ichihara; Tokinori Agoo, Hiroshima; Toru Taguchi; Hisaya Miki, both of Iwakuni; Yutaka Haneda, and Sadao Yoshimoto, both of Iwakuni, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Continuation of Ser. No. 10,136, Dec. 29, 1986, abandoned. This application Feb. 2, 1990, Ser. No. 473,105

Claims priority, application Japan, Sep. 20, 1985, 60-209275; Sep. 20, 1985, 60-209276

Int. Cl.[5] C07C *39/14*

U.S. Cl. 568—717 12 Claims

1. A process for producing 2,6-dihydroxynaphthalene, which comprises:

(1) oxidizing 2,6-diisopropylnaphthalene with molecular oxygen in a reaction system having an aqueous phase containing a base to form oxidation reaction products comprising dihydroperoxide, monohydroxymonohydroperoxide and dihydroxide of 2,6-diisopropylnaphthalene, said oxidation being conducted at a pH of between 11 and 14, said base being added as an aqueous solution having a concentration of 1 to 25% by weight in an amount to provide 0.2 to 1.0 gram-equivalent of said base per mole of said 2,6-diisopropylnaphthalene; and

(2) subjecting the resultant mixture containing said reaction products to acid cleavage in the presence of hydrogen peroxide to obtain 2,6-dihydroxynaphthalene.

4,996,373

PROCESS FOR PRODUCING DIHYDROXYDIARYLALKANES

Ludwig Bottenbruch, Krefeld; Heinrich Ruppert, Bergisch Gladbach, both of Fed. Rep. of Germany; Neil S. Isaacs, Henley on Thames, and Kenneth G. Latham, Blewsbury Berkshire, both of Great Britain, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Filed Oct. 10, 1989, Ser. No. 419,062

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1988, 3835204

Int. Cl.[5] C07C *37/20, 39/16*

U.S. Cl. 568—727 17 Claims

1. A process for producing 4,4'-dihydroxydiphenyl alkanes or its derivatives characterized in that an excess of phenol is caused to react with ketone at a pressure of at least 1000 bar at temperatures of 20 to 100° C.

4,996,374

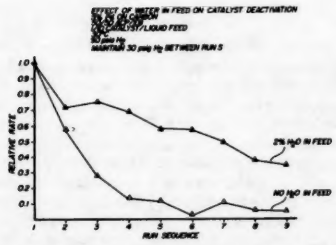
HYDROGENATION OF ACETOPHENONE

Shaw-Chan Lin, and Robert N. Cochran, both of West Chester, Pa., assignors to Arco Chemical Technology, Inc., Wilmington, Del.

Filed Dec. 15, 1989, Ser. No. 451,672

Int. Cl.[5] C07C *29/145, 29/143*

U.S. Cl. 568—814 6 Claims



1. The process for the hydrogenation of acetophenone to alpha-methyl benzyl alcohol which comprises contacting a mixture of acetophenone and a solvent comprised of ethylbenzene and/or alpha-methyl benzyl alcohol with hydrogen and a catalyst comprised of palladium supported or carbon or alumina at hydrogenation conditions of 20° to 50° C. and at least 5 psig hydrogen pressure, said mixture also containing 1 to 5 weight percent of water effective to reduce the rate of catalyst deactivation.

4,996,375

VITAMIN E INTERMEDIATES AND A PROCESS FOR THEIR MANUFACTURE AND CONVERSION INTO VITAMIN E

Richard Barner, Witterswil, and Josef Hübscher, Nunningen, both of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

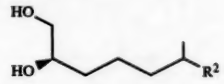
Division of Ser. No. 119,879, Nov. 12, 1987, Pat. No. 4,851,585. This application Apr. 24, 1989, Ser. No. 341,889

Claims priority, application Switzerland, Nov. 28, 1986, 4472/86; Sep. 29, 1987, 3809/87

Int. Cl.[5] C07C *31/20, 43/303;* C07F *7/08*

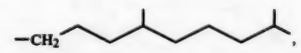
U.S. Cl. 568—853 4 Claims

1. A compound of the formula



III

wherein R^2 is



$—CH(OR^3)_2$ or $—CH_2R^4$ where R^3 is lower alkyl and R^4 represents halogen or taken together with its attached carbon atom forms a hydrolyzable ether protecting group.

4,996,376

PREPARATION OF DINITROTOLUENES

Claude Doussain, Saint-Fons; Michel Gubelmann, Lyon, and Jean-Michel Popa, Drancy, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Oct. 24, 1989, Ser. No. 425,930

Claims priority, application France, Oct. 24, 1988, 88 14228

Int. Cl.[5] C07C *205/06*

U.S. Cl. 568—934 11 Claims

1. A process for the preparation of a dinitrotoluene, comprising reacting at least one mononitrotoluene with nitric acid, in liquid phase, in the presence of a catalytically effective amount of an inorganic acidic solid including at least one component which comprises orthophosphoric acid, pyrophosphoric acid, metaphosphoric acid, a metal dihydrogen phosphate, a metal hydrogen phosphate, a metal orthophosphate or a metal pyrophosphate, said metal cations having from 1 to 5 positive charges.

4,996,377

PREPARATION OF ALIPHATICALLY SUBSTITUTED FLUOROBENZENES

Jochen Wild, Deidesheim; Albrecht Harreus, Ludwigshafen, and Norbert Goetz, Worms, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

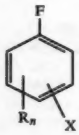
Filed Feb. 21, 1990, Ser. No. 482,646

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1989, 3909486

Int. Cl.[5] C07C *17/22, 25/13, 25/18*

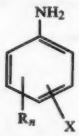
U.S. Cl. 570—141 4 Claims

1. A process for the preparation of an aliphatically substituted fluorobenzene of the formula I



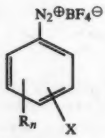
I

where R is an aliphatic or cycloaliphatic radical, n is 2, 3 or 4 and X is hydrogen, fluorine, chlorine or bromine, by diazotization of the corresponding aniline derivative of the formula II



II

in the presence of tetrafluoboric acid and decomposition of the resulting diazonium tetrafluoborate of the formula III



III

wherein the decomposition reaction is carried out simultaneously with the diazotization reaction, in the presence of elemental copper and/or copper(I) and/or copper(II) salts and at from −15° to 80° C.

4,996,378

PROCESS FOR PRODUCTION OF 1,1-DICHLORO-1-FLUOROETHANE AND/OR 1-CHLORO-1,1-DIFLUOROETHANE

Danny W. Wright, Hickory, and Barry L. Wagner, Benton, both of Ky., assignors to Atochem North America, Inc., Philadelphia, Pa.

Filed Jul. 13, 1989, Ser. No. 379,518

Int. Cl.[5] *C77C 17/20*

U.S. Cl. 570—164 13 Claims

1. A process for the production of 1,1-dichloro-1-fluoroethane and/or 1-chloro-1,1-difluoroethane comprising:

(a) treating 1,1,1-trichloroethane in a first reaction zone with hydrogen fluoride in a molar ratio of hydrogen fluoride to 1,1,1-trichloroethane of at least about 20:1 for a period of time to selectively form 1,1-dichloro-1-fluoroethane over 1-chloro-1,1-difluoroethane;

(b) forming first and second 1,1-dichloro-1-fluoroethane-containing streams from the first reaction zone effluent;

(c) cooling the first 1,1-dichloro-1-fluoroethane-containing stream to separate said stream into a hydrogen fluoride-rich liquid phase and a 1,1-dichloro-1-fluoroethane-rich liquid phase, and separating the two phases;

(d) treating the second 1,1-dichloro-1-fluoroethane-containing stream with hydrogen fluoride in a second reaction zone in a molar ratio of at least about 20:1 of hydrogen fluoride to 1,1-dichloro-1-fluoroethane in the second 1,1-dichloro-1-fluoroethane-containing stream for a period of time sufficient to form 1-chloro-1,1-difluoroethane; and

(e) cooling the effluent from the second reaction zone to separate said effluent into a hydrogen fluoride-rich liquid phase and a 1-chloro-1,1-difluoroethane-rich liquid phase, and separating the two phases.

4,996,379

METHOD OF PREPARING 1,1,1,2-TETRAFLUOROETHANE FROM 1,1-DICHLORO-1,2,2,2-TETRAFLUOROETHANE

Hideki Oshio, Omiya; Sadaharu Mishumi, Kawagoe; Kiyoshi Yagii, Fujimi; Satoshi Yoshikawa, Saitama, and Katsuyoshi Murata, Kawagoe, all of Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed May 26, 1989, Ser. No. 357,291

Claims priority, application Japan, May 30, 1988, 63-132395; Dec. 19, 1988, 63-320077; Dec. 23, 1988, 63-324998; Jan. 13, 1989, 1-7056

Int. Cl.[5] C07C *17/10, 19/08, 17/08*

U.S. Cl. 570—176 14 Claims

1. A method of preparing 1,1,1,2-tetrafluoroethane, comprising reacting 1,1-dichloro-1,2,2,2-tetrafluoroethane with hydrogen gas in the presence of a palladium-on-active alumina catalyst at a temperature lower than 200° C. and not lower than 120° C.

4,996,380

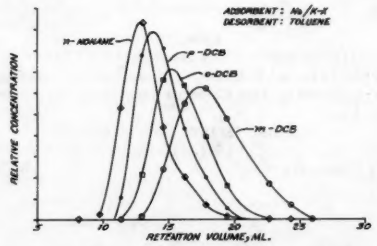
PROCESS FOR EXTRACTING META-DICHLOROBENZENE FROM ISOMER MIXTURES WITH MIXED ALKALI METAL EXCHANGED X ZEOLITE ADSORBENTS

Beth McCulloch, Barrington, and Michael G. Gatter, Elk Grove Village, both of Ill., assignors to UOP, Des Plaines, Ill.

Filed Nov. 8, 1989, Ser. No. 433,500

Int. Cl.[5] C07C *17/38*

U.S. Cl. 570—211 6 Claims



1. A process for separating m-dichlorobenzene from feed mixtures of m-dichlorobenzene and at least one other isomer of dichlorobenzene which process comprises contacting said feed mixture at adsorption conditions, including a temperature of from about 20° C. to about 250° C. and a pressure sufficient to maintain liquid phase with an adsorbent comprising an X-type zeolite exchanged with a mixture of sodium and potassium ions at the cation exchange sites at a weight ratio of sodium to potassium in the range from 0.65:1 to 2:1, selectively adsorbing said m-dichlorobenzene more strongly than said other isomers, removing the relatively non-adsorbed portion of the feed mixture from contact with the adsorbent, and thereafter recovering m-dichlorobenzene from the adsorbent by contacting said

adsorbent, at desorption conditions, including a temperature of from about 20° C. to about 250° C. and a pressure sufficient to maintain liquid phase, with an alkylbenzene desorbent.

4,996,381

INCREASED CONVERSION OF C_2–C_{12} ALIPHATIC HYDROCARBONS TO AROMATIC HYDROCARBONS USING A HIGHLY PURIFIED RECYCLE STREAM

John L. Pickering, Jr., Kingswood, Tex., and Margaret Nemet-Mavrodin, Cherry Hill, N.J., assignors to Mobil Oil Corp., New York, N.Y.

Filed Oct. 7, 1988, Ser. No. 254,556
Int. Cl.[5] C07C *15/00*
U.S. Cl. 585—413 **8 Claims**

1. A process for converting an aliphatic C_2–C_{12} hydrocarbon feedstream to a predominately aromatic product stream comprising the steps of:

(a) heating a feedstream comprising C_2–C_{12} hydrocarbons;

(b) contacting said heated feedstream with a zeolite catalyst in a reaction zone under conversion conditions;

(c) withdrawing a product stream from said reaction zone;

(d) separating said product stream into a gas stream comprising hydrogen and C_4— hydrocarbons and a liquid stream comprising aromatic hydrocarbons and C_5+ aliphatic hydrocarbons;

(e) further separating said liquid stream of step (d) into an aromatic product and a heavy aliphatic recycle stream;

(f) mixing said heavy aliphatic recycle stream with said feedstream of step (a);

(g) further separating said gas stream of step (d) into an off-gas stream comprising methane and hydrogen and a light aliphatic recycle stream containing less than 0.5 wt. % hydrogen; and

(h) mixing said light aliphatic recycle stream with said feedstream of step (a).

4,996,382

PROCESS FOR PREPARATION OF HYDROCARBONS

Ikuya Matsuura, Toyama, and Yasushi Yoshida, Yamaguchi, both of Japan, assignors to Ube Industries, Ltd., Japan

Filed Dec. 5, 1988, Ser. No. 279,753
Claims priority, application Japan, Dec. 11, 1987, 62-312127
Int. Cl.[5] C07C *2/00*
U.S. Cl. 585—500 **19 Claims**

1. A process for a preparation of hydrocarbons having at least two carbon atoms, which comprises bringing a methane-containing gas maintained at a temperature of 500° to 1500° C. into contact with an oxygen-containing gas in the presence of a catalyst to effect oxidative coupling, wherein the catalyst comprises (1) a single-crystal, high-purity, and ultra-fine powdery magnesium oxide obtained by a gas-phase oxidation method, and (2) an alkali metal oxide.

4,996,383

INERT PURGE IN CATALYTIC DIMERIZATION OF OLEFINS

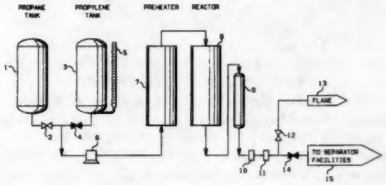
Jeffrey R. Burkinshaw, Bartlesville, and Leo L. Gingerich, Nowata, both of Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 26, 1990, Ser. No. 503,599
Int. Cl.[5] C07C *2/04*
U.S. Cl. 585—516 **12 Claims**

1. A method for catalytic dimerization using a dimerization catalyst comprising the steps of:

(a) purging said dimerization catalyst during startup of said dimerization with an aliphatic hydrocarbon having 2 to 5 carbon atoms; and

(b) thereafter substituting a dimerizable organic compound for said aliphatic hydrocarbon and flowing said dimeizable organic compound into contact with said dimerization catalyst.

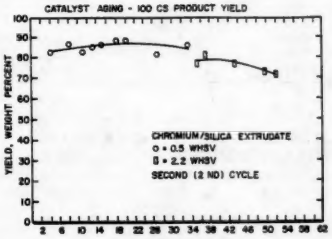


4,996,384

REGENERATION OF REDUCED METAL OXIDE OLIGOMERIZATION CATALYST

Bruce P. Pelrine, Trenton, and Margaret M. Wu, Belle Mead, both of N.J., assignors to Mobil Oil Corporation, Fairfax, Va.

Continuation-in-part of Ser. No. 282,362, Dec. 9, 1988, Pat. No. 4,926,004. This application Feb. 20, 1990, Ser. No. 481,279
The portion of the term of this patent subsequent to May 15, 2007, has been disclaimed.
Int. Cl.[5] C07C *2/10*
U.S. Cl. 585—530 **15 Claims**



1. In a process for the preparation of olefin oligomers from alpha-olefin feedstock containing 6 to 20 carbon atoms, or mixtures of such olefins, comprising contacting said olefins under oligomerization conditions, at a reaction temperature between −20° to 250° C., and with a reduced chromium catalyst on a porous support, which catalyst has been treated by oxidation at a temperature of 200° to 900° C. in the presence of an oxidizing gas and then by treatment with a reducing agent at a temperature and for a time sufficient to reduce said catalyst to a lower valence state, to produce an olefin oligomer composition comprising C_{30}–$C_{10,000}$ hydrocarbons, said composition, having a branch ratio of less than 0.19, number average molecular weight between 420 and 45,000, weight average molecular weight between 420 and 200,000, and a molecular weight distribution between 1 and 5, while deactivating the catalyst the improvement comprising:

regenerating the deactivated chromium catalyst under regenerating conditions in a process comprising the steps of:

(a) stripping the deactivated catalyst with inert gas at an elevated temperature and for a time sufficient to strip unreacted olefin and oligomer product;

(b) contacting the deactivated, stripped catalyst with a stream of oxidizing gas while heating to an elevated temperature at a rate and for a time sufficient to oxidize the chromium of the catalyst and remove carbonaceous deposits from the catalyst;

(c) cooling the oxidized catalyst and contacting it with a stream of reducing gas in an amount sufficient and at a

temperature and for a time sufficient to reduce the chromium of the oxidized catalyst to essentially lower valent chromium.

4,996,385

USE OF SILICA-TITANIA HYDROCARBON CONVERSION CATALYST IN HYDROCARBON CONVERSION PROCESSES

Leonard A. Cullo, Greensburg, and Francis J. Shiring, III, Hampton Township, Allegheny County, both of Pa., assignors to Aristech Chemical Corporation, Pittsburgh, Pa.

Division of Ser. No. 286,909, Nov. 17, 1988, Pat. No. 4,906,793, which is a continuation-in-part of Ser. No. 923,502, Oct. 27, 1986, abandoned, which is a continuation-in-part of Ser. No. 796,136, Nov. 8, 1985, Pat. No. 4,711,869. This application Dec. 18, 1989, Ser. No. 451,833

The portion of the term of this patent subsequent to Mar. 6, 2007, has been disclaimed.

Int. Cl.[5] C07C *1/24*

U.S. Cl. 585—640 **3 Claims**

1. Method of conducting an acid catalyzed reaction selected from the group consisting of alkylation, isomerization, cracking, dealkylation, disproportionation, dehydration, oligomerization, polymerization, and cyclization comprising contacting an organic compound with a calcined crystalline titania-magnesia-silica catalyst having the molar ratios 0.015 to 0.04 TiO_2 and 0.08 to 0.17 MgO to 1.0 SiO_2 and an X-ray diffraction pattern characterized by peaks as follows:

2θ	d(A)	I/Io × 100
7.75	11.39	49
8.30	10.64	13
8.70	10.16	100
13.70	6.46	13

at a temperature of from about 300°–450° C., a pressure of about 1 to about 5 atmospheres and at a rate of feed no greater than about 1.5 grams of feed per gram of catalyst per hour, and recovering an organic compound product which has undergone such reaction.

4,996,386

CONCURRENT ISOMERIZATION AND DISPROPORTIONATION OF OLEFINS

David M. Hamilton, Jr., Houston, and Richard A. Kemp, Stafford, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 21, 1989, Ser. No. 454,244

Int. Cl.[5] C07C *6/00, 5/23*

U.S. Cl. 585—646 **18 Claims**

1. A process for the concurrent isomerization and disproportionation of olefinic hydrocarbons having carbon numbers ranging from C_2 to about C_{100} which comprises contacting said olefins with a catalyst prepared by incorporating cobalt, a heavy metal selected from the group consisting of molybdenum, tungsten and mixtures thereof, and a ferrierite compound into an alumina hydrogel and subsequently calcining to prepare said catalyst.

4,996,387

DEHYDROGENATION PROCESS

Bruce W. Gerhold, and Richard L. Anderson, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 20, 1989, Ser. No. 382,453

Int. Cl.[5] C07C *5/34*

U.S. Cl. 585—654 **10 Claims**

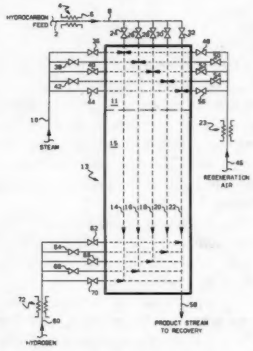
1. A continuous process for dehydrogenating dehydrogenatable hydrocarbons comprising the steps of:

(a) feeding an admixture of said dehydrogenatable hydrocarbon and a diluent to at least two catalyst-containing tubes within a furnace chamber of a reactor;

(b) contacting said admixture with catalyst contained in said at least two catalyst-containing tubes in said furnace chamber under endothermic dehydrogenating conditions so as to establish at least two product-producing tubes;

(c) combining the effluent from each of said at least two product-producing tubes so as to form a common product stream;

(d) cyclically discontinuing the flow of said dehydrogenatable hydrocarbon and initiating flow of a free-oxygen containing gas under regeneration conditions while continuing the flow of diluent to at least one of said at least two product-producing tubes so as to establish at least one



regenerating tube having a free-oxygen containing effluent and at least one product-producing tube;

(e) adding a free hydrogen-containing gas to the effluent of said at least one regenerating tube prior to combining the effluent of said at least one regenerating tube with the effluent of said at least one product-producing tube; and

(f) wherein a sufficient quantity of hydrogen-containing gas is added to the effluent of said at least one regenerating tube in step (e) so as to react at least a portion of free oxygen contained in the effluent of said at least one regenerating tube with free hydrogen added in step (e) before the oxygen-containing effluent of said at least one regenerating tube is combined with the effluent of said at least one product-producing tube.

4,996,388

SEPARATION OF ETHYLTOLUENE ISOMERS

Michael M. Olken; Guo-shuh J. Lee, and Juan M. Garces, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 26, 1990, Ser. No. 558,355

Int. Cl.[5] C07C *7/13*

U.S. Cl. 585—828 **22 Claims**

14. A process comprising (a) contacting a mixture of the ortho, meta and para isomers of ethyltoluene with a first adsorbent bed comprising ferrierite under conditions such that the ortho and meta isomers are not significantly adsorbed while the para isomer is selectively adsorbed, (b) collecting a mixture of the ortho and meta isomers leaving the adsorbent bed, (c) removing the para isomer from the first adsorbent bed by varying the conditions of the adsorbent bed such that the para isomer is removed, (d) contacting the mixture of the ortho and meta isomers with a second adsorbent bed comprising silicalite under conditions such that the ortho isomer is not significantly adsorbed while the meta isomer is selectively adsorbed, (e) collecting the ortho isomer, and (f) removing the meta isomer from the second adsorbent bed by varying the conditions in the bed such that the meta isomer is removed.

4,996,389

ALGAL STRAIN FOR AGAR PRODUCTION

Kimon T. Bird, Vero Beach, Fla., assignor to Harbor Branch Oceanographic Institution, Inc., Ft. Pierce, Fla.

Filed Aug. 1, 1988, Ser. No. 226,814
Int. Cl.[5] A01H *13/00*; A01G *33/00*
U.S. Cl. 800—200 1 Claim

1. The biologically pure somaclonal variant designated G-16S of the species *Gracilaria verrucosa*.

4,996,390

NOVEL INTERSPECIFIC MUSHROOM STRAINS

Kurt R. Dahlberg, Napoleon, Ohio, assignor to Campbell Soup Company, Camden, N.J.

Filed Jan. 19, 1989, Ser. No. 298,727
Int. Cl.[5] A01H *15/00*
U.S. Cl. 800—220 2 Claims

1. A strain of the genus Agaricus which has the distinguishing characteristics of the strain deposited with the American Type Culture Collection under accession number 20916.

4,996,391

PRINTED CIRCUIT BOARD HAVING AN INJECTION MOLDED SUBSTRATE

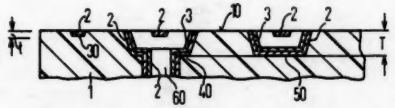
Hans Schmidt, Eurasburg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 3, 1989, Ser. No. 388,818

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1988, 3833353

Int. Cl.[5] H05K *1/00, 3/10*

U.S. Cl. 174—255 15 Claims



1. A printed circuit board comprising:

an injection molded substrate having a surface;

a pattern of interconnect traces, through-connections and connecting pads recessed in said substrate surface formed by a trench-shaped depression in the region of each interconnect trace and by a planar depression in at least one of (a) the region of each through-connection and (b) the region of each connecting pad; and

said planar and trench-shaped depressions having a conductive metal coat, the depth of each trench-shaped depression being dimensioned less than the depth of each planar depression, so that, as a result of the difference in depth between each trench-shaped depression and each planar depression, said metal coat fills each trench-shaped depression to the surface of the substrate, and in each planar depression a distance remains between the metal coat and the surface of the substrate.

5. A method for manufacturing a circuit board comprising:

generating a pattern of recesses in a surface of a substrate by forming a trench-shaped depression in the region of an interconnect trace and by forming a planar depression in at least one of (a) the region of a through-connection or (b) the region of a connecting pad, with the depth of said trench-shaped depression being less than the depth of said planar depression; and

applying a metal coat to said substrate so that, as a result of the difference in depth between said trench-shaped depression and said planar depression, said metal coat fills said trench-shaped depression to said surface of said substrate and in said planar depression a distance remains between the metal coat and said surface of said substrate.

4,996,392

SUPERCONDUCTOR MAGNETIC IMAGE DETECTION DEVICE

Takao Tagawa, Kashihara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 17, 1989, Ser. No. 324,686

Claims priority, application Japan, Mar. 18, 1988, 63-66310

Int. Cl.[5] G08C *21/00*

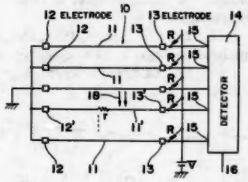
U.S. Cl. 178—18 22 Claims

1. A magnetic image detection device comprising:

one or more superconductor bodies provided on a nonmagnetic dielectric substrate;

each superconducting body is elongated to form a single stripe, and a first electrode and second electrode are alternatively provided at even intervals and on top of each superconducting body; and

a detection circuit which detects separately electrical resistance between the first electrode and the second electrode of each superconductive body;



whereby a distribution in the first dimension of magnetism acting upon the superconducting body is detected by the detection circuit.

4,996,393

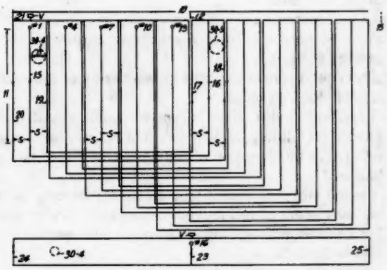
DIGITIZER TABLET WITH SPLIT-CURRENT CONDUCTOR ARRAY

Thomas C. Zalenski, Killingworth, and Jamie L. Barbetti, Milford, both of Conn., assignors to Summagraphics Corporation, Seymour, Conn.

Filed Apr. 3, 1990, Ser. No. 503,537

Int. Cl.[5] G08C *21/00*

U.S. Cl. 178—19 34 Claims



1. An electromagnetic digitizer tablet having an electrode array under an active tablet area and a pointing device having an inductor, the combination when energized with the pointing device over the electrode array will generate electrical signals representative of the pointing device location over the array with respect to at least one tablet coordinate,

said electrode array comprising a plurality of individual elongated conductors capable of selective excitation or selective signal detection, each array conductor comprising at least three active parallel conductor portions distributed under the active tablet area,

means interconnecting the active parallel conductor portions of each array conductor such that the current flowing in one of the parallel conductor portions is divided among the other parallel conductor portions,

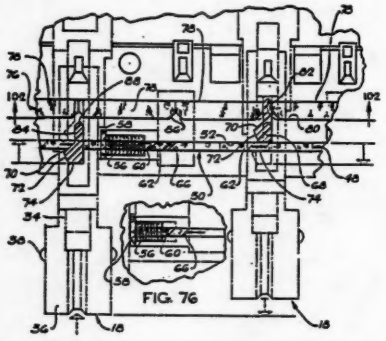
means selectively connectable to each array conductor such that excitation or induced currents flow simultaneously in all its parallel portions.

4,996,394

PUSH BUTTON VACUUM-ELECTRIC AIR CONTROL DEVICE FOR AUTOMOTIVE VEHICLES

John G. Cummings, Cary, Ill., assignor to Indak Manufacturing Corp., Northbrook, Ill.

Division of Ser. No. 293,370, Jan. 4, 1989, Pat. No. 4,926,014.
This application Mar. 9, 1990, Ser. No. 491,080
Int. Cl.[5] H01H 9/26
U.S. Cl. 200—5 E 5 Claims



1. A control device for vacuum-electric switching or the like, said control device comprising

a housing,

an array of push buttons including a plurality of push buttons mounted in said housing for generally parallel sliding movement between extended and depressed positions,

resilient means for biasing said push buttons toward their extended positions,

latching means for latching any selected one of said push buttons in its depressed position while unlatching the other push buttons,

and a lockout mechanism for preventing simultaneous movement of more than one of said push buttons to the depressed position,

said lockout mechanism comprising an array of transversely slidable lockout blocks,

said housing having guide means for guiding said lockout blocks for sliding movement in a transverse direction relative to the direction of sliding movement of said push buttons,

said guide means including stop means for limiting the sliding movement of said lockout blocks and thereby producing a predetermined limited clearance between any two of said lockout blocks,

each of said push buttons having a clearance-penetrating member for penetrating and occupying the clearance in a corresponding location along the array of said lockout blocks,

each of said clearance-penetrating members being dimensioned for substantially occupying said clearance so that said clearance is available for only one of said clearance-penetrating members at any particular time,

and resilient takeup means acting along said array of said lockout blocks for resiliently taking up said clearance to avoid looseness and rattling of said lockout blocks,

said lockout blocks including endmost pairs thereof at opposite ends of said array thereof,

said blocks of said endmost pairs having spring-receiving means,

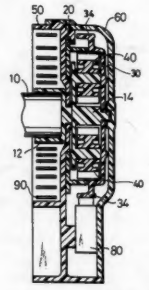
said resilient takeup means comprising a pair of takeup springs for engaging said spring-receiving means and compressively acting between said blocks of said endmost pairs thereof.

4,996,395

SEAT BELT RETRACTION AND SWITCH WITH PERIPHERAL INTERNAL GEARING AND PLANETARY GEARING ASSEMBLY

Tatsuo Tada, Kanagawa, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 5, 1989, Ser. No. 375,407
Claims priority, application Japan, Jul. 6, 1988, 63-168156
Int. Cl.[5] B65H 75/00; F16H 57/00; H01H 3/16
U.S. Cl. 200—61.58 B 6 Claims



1. A retractor with a means for detecting the amount of a webbing wound on a retractor shaft supported rotatably on a base, said means being of the type that the amount of the webbing wound on the retractor shaft is determined on the basis of the number of revolutions which the retractor shaft has undergone, comprising:

first and second internal gears having different numbers of teeth and arranged side by side in the direction of an axis of the retractor shaft, said first internal gear being provided on the base, and said second internal gear being rotatably supported on the base;

a rotary plate fixed on the retractor shaft and having a support portion at a position deviated from the center axis of the retractor shaft; and

at least one planetary gear rotatably supported on the support portion of the rotary plate, said planetary gear having a number of teeth which are formed in an outer periphery of said planetary gear and which are in meshing engagement with both the first and second internal gears.

3. The retractor as claimed in claim 1, further comprising:

a switch provided on the base; and

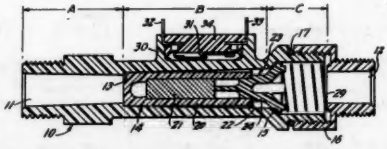
switch actuator means for actuating said switch, said switch actuator means being formed on said second internal gear.

4,996,396

FLOW SWITCH

Ronald J. Smith, Shelton, Conn., assignor to Imo Industries, Inc., Princeton, N.J.

Filed Oct. 30, 1989, Ser. No. 428,933
Int. Cl.[5] H01H 35/38
U.S. Cl. 200—81.9 M 15 Claims



1. A magnetically operated flow switch, comprising a tubular body of magnetically-transparent material and having an elongate bore extending downstream between an inlet port and an outlet port, a piston guided for longitudinal displaceability

in a first longitudinal portion of said bore, said piston containing a permanent-magnet element and having at least one longitudinally continuous flow-channel formation in its outer surface, said bore having a second longitudinal portion that is downstream from said first longitudinal portion, said second longitudinal portion being enlarged with respect to said first longitudinal portion, and said bore being stepped between said first and second longitudinal portions, said piston having plural angularly spaced radially outward lug formations at its downstream end for limiting upstream displaceability of said piston beyond lug interference with the stepped portion of said bore, compressionally preloaded spring means retained within said second longitudinal portion and engaged to the downstream end of said piston to continuously urge the same toward a limit of upstream displaceability at lug engagement with the stepped portion of said bore, and a sealed magnetic-reed switch fixedly carried by said body at a longitudinal location having actuable relation to the field of said magnet in the course of its range of displaceability downstream from its said limit of upstream displaceability.

4,996,397

SPRING-FORCE DRIVE FOR A POWER SWITCH

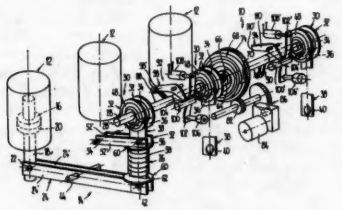
Max Kuhn, Unterentfelden, and Rudi Schmidt, Kolliken, both of Switzerland, assignors to Sprecher Energie AG, Oberentfelden, Switzerland

Filed Feb. 22, 1990, Ser. No. 482,919

Claims priority, application Switzerland, Mar. 3, 1989, 00800/89

Int. Cl.[5] H01H *33/66*

U.S. Cl. 200—144 B **12 Claims**



1. A spring-force drive for a power switch, in particular a vacuum switch for medium-high voltage, said spring force drive comprising,

a drive shaft,

drive means for driving the drive shaft by a spring arrangement for switching on and off the power switch in the same direction of rotation of the drive shaft,

support means for releasably impeding the drive shaft from turning in a switch-off and a switch-on position,

at least one disk of a cam disk arrangement with a control cam mounted on the drive shaft acting with a pushing force on a reciprocating member connected operatively to at least one movable switch contact, the at least one disk being fixed in terms of rotation to move the reciprocating member to and fro between two final positions,

the at least one disk having at least one groove forming the control cam running around the drive shaft and being open in the direction of the drive shaft for acting on the reciprocating member with a pulling force.

4,996,398

MEDIUM TENSION CIRCUIT BREAKING HAVING HIGH NOMINAL CURRENT

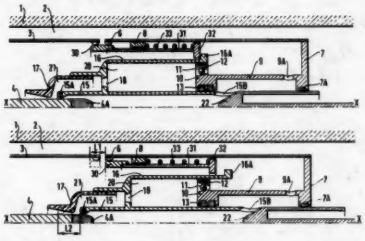
Denis Dufournet, Bron, and Michel Perret, Tramole, both of France, assignors to GEC Alsthom SA, Paris, France

Filed May 21, 1990, Ser. No. 525,589

Claims priority, application France, May 19, 1989, 89 06554

Int. Cl.[5] H01H *33/88*

U.S. Cl. 200—148 A **4 Claims**



1. A dielectric blast gas circuit breaker comprising a main fixed contact, a main arcing contact, and moving equipment including, in particular, a moving arcing contact and blast means, wherein the circuit breaker includes a moving main contact which is disunited from said moving equipment and which is implemented by means of a short cylindrical element associated with means communicating a speed thereto during circuit breaking which is lower than the speed of the moving equipment.

4,996,399

HIGH OR MEDIUM TENSION CIRCUIT BREAKER

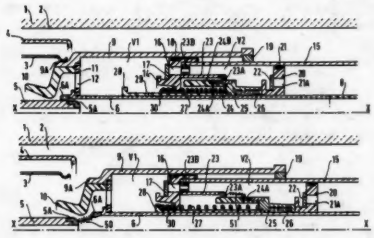
Edmond Thuries, Pusignan; Denis Dufournet, Bron, and Michel Perret, Tramole, all of France, assignors to GEC Alsthom SA, Paris, France

Filed Jul. 3, 1990, Ser. No. 547,276

Claims priority, application France, Jul. 4, 1989, 89 08975

Int. Cl.[5] H01H *33/88*

U.S. Cl. 200—148 A **4 Claims**



1. A circuit breaker for high and medium tension including insulation by means of a dielectric gas a puffer arc blasting, the circuit breaker comprising a gastight insulating casing, containing:

a fixed assembly comprising, in particular, a fixed main contact and a fixed arcing contact;

a moving assembly driven by a drive rod and including, in particular, a moving main contact and a moving arcing contact;

a first blast volume extended by a blast nozzle;

a blast piston; and

first and second secondary contacts disposed inside a second volume and designed to strike a secondary arc;

wherein the first secondary contact is fixed relative to the

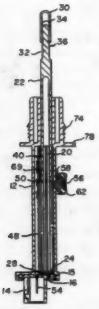
fixed assembly, the second secondary contact being semi-moving relative to the moving assembly, possessing its own source of energy for displacing it during a circuit breaker disengagement operation, and being provided with means for conferring a shorter stroke thereto than the stroke of the moving assembly.

4,996,400

SELF ADJUSTING SWITCH

Richard J. Ricci, and Wallace E. Gebhardt, both of Logansport, Ind., assignors to Federal-Mogul Corporation, Southfield, Mich.

Filed Oct. 23, 1989, Ser. No. 425,545
Int. Cl.[5] H01H *13/02*
U.S. Cl. 200—345 **5 Claims**



1. A self adjusting switch having a stroke length which is adjusted and set automatically during installation, comprising:

a housing,

a plunger slidably fitted within said housing,

installation engagement means provided on said housing for selectively engaging said plunger and preventing axial movement of said plunger with respect to said housing during installation of said switch,

an adjustable cap fitted on an end portion of said plunger, said cap being axially adjustable in a single direction upon selective engagement of said engagement means with said plunger so as to adjust and set said stroke length; and

switch contact means operatively associated with said plunger.

4,996,401

SWITCH

Sung-Taek Park, Inchon, Rep. of Korea, assignor to Prince Corporation, Holland, Mich.

Filed Jun. 29, 1989, Ser. No. 373,181
Int. Cl.[5] H01H *19/62*
U.S. Cl. 200—527 **14 Claims**

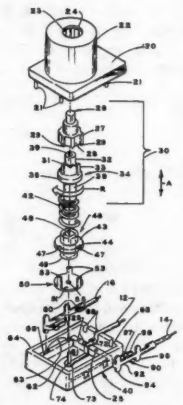
7. A push-button switch comprising:

a switch housing comprising an upper housing part and a lower housing part;

plunger means mounted in said housing for sliding movement along a first axis and including means for converting said sliding movement of a portion of said plunger means to a rotary movement around said axis;

a cylindrical contact holder receiving a moveable switch contact element, said contact holder including means for slideably receiving a portion of said plunger means and means for keying said holder to said position of said plunger means for rotation therewith, a first fixed contact member having a portion located below said contact holder; said moveable switch contact element including a first portion extending laterally from said first axis for continuous contact with said first fixed contact member below said cylindrical contact holder, said moveable contact element having a second end portion extending in an axial direction generally parallel to said first axis and adjacent the periphery of said cylindrical contact holder;

at least one second fixed contact member mounted in said housing on an inner wall of at least one of said upper and lower housing parts and in position to be selectively engaged by said second end portion of said contact element at a predetermined rotational position of said moveable contact element, said second fixed contact member being generally shaped to provide one leg of said second fixed contact member abutting the inner wall of said housing and another leg having a portion thereof spaced radially inwardly from said wall to engage said contact holder and selectively engage said second end portion of said move-



able contact element when aligned therewith; a spring located between said plunger means and said contact holder for biasing said laterally extending end portion against said first fixed contact element, and said other leg of said fixed second contact being resilient to bias and wipe said other leg over said second end portion of said contact member as said contact holder is rotated by pushing on said plunger means whereby a clean make-and-break connection is made between said second end portion of said contact element and said other leg of said second fixed contact member and a continuous biased electrical connection is made between said laterally extending first portion of said moveable contact element and said first fixed contact member.

4,996,402

METHOD AND APPARATUS FOR CONTINUOUSLY MELTING MATERIAL BY INDUCTION HEATING

Hideo Hashida; Hideki Kanno, both of Tochigi; Senri Okada, Tokyo; Kokichi Nakamura, Tondabayashi, and Haruyoshi Sumimoto, Kyoto, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 27, 1989, Ser. No. 457,840
Claims priority, application Japan, Feb. 28, 1989, 01-045399
Int. Cl.[5] H05B *6/10*
U.S. Cl. 219—10.41 **25 Claims**

1. A method of continuously heating and melting a material, comprising the steps of:

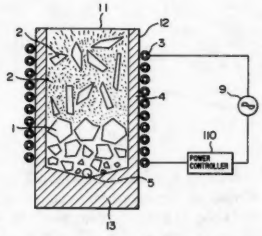
forming a layer of one of a carbon material and an electrically conductive refractory material on a bottom of a furnace which is provided with a melt outlet adjacent said bottom and an inlet for said one of said carbon material and said electrically conductive refractory material in an upper portion of said furnace;

heating said layer by electromagnetic induction heating;

feeding the material to be melted onto the thus heated layer and heating and melting the material to be melted by electromagnetic induction heating;

substantially inhibiting air flow in said furnace during at least a part of the heating and melting of the material to be melted;

causing a melt of said material to flow out of said furnace through said melt outlet; and



determining a value of a ratio between the quantities of heat to be supplied by said electromagnetic induction heating to said layer and said material to be melted, which value of said ratio is necessary to obtain a desired temperature of a melt of said material to be melted flowing out of said furnace; and

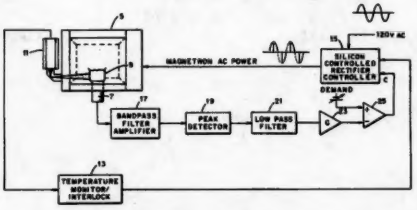
controlling said heat supplied by said electromagnetic induction heating so that said ratio is substantially equal to said determined value.

4,996,403

ACOUSTIC EMISSION FEEDBACK CONTROL FOR CONTROL OF BOILING IN A MICROWAVE OVEN

Terry L. White, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 5, 1990, Ser. No. 474,906
Int. Cl.[5] H05B *6/68*
U.S. Cl. 219—10.55 B **8 Claims**



1. A system for controlling the boiling level of a liquid medium in a microwave applicator comprising:

a microwave applicator for microwave energy heating of a liquid medium contained therein to be boiled by means of microwave heating;

an acoustic emission sensing means for sensing the acoustic emissions from said liquid medium correlated with surface boiling thereof and generating a feedback signal having an amplitude proportional to the level of boiling of the medium;

a control signal generating means for comparing the amplitude of said feedback signal with the amplitude of a selected demand signal corresponding to a selected boiling level of said liquid to generate a control signal which varies with the difference in amplitude between said demand and said feedback signal; and

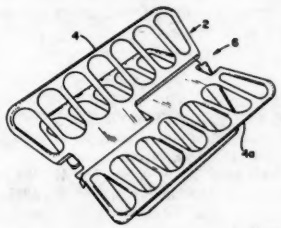
a power control means responsive to said control signal for automatically and continuously varying the power applied to said applicator to control the boiling level of said liquid medium contained within the applicator at said selected level corresponding to said demand signal.

4,996,404

COOKING APPARATUS FOR ROASTING FOOD

Robert B. Skerker, Buffalo, N.Y., and William Prindle, Santa Barbara, Calif., assignors to Robinson Knife Manufacturing Co., Inc., Springville, N.Y.

Filed Mar. 13, 1990, Ser. No. 493,139
Int. Cl.[5] H05B *6/80*
U.S. Cl. 219—10.55 E **13 Claims**



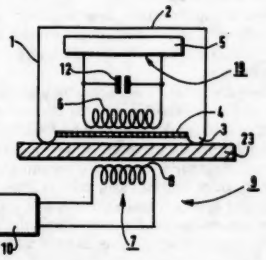
1. An apparatus for suspending a food product while cooking comprising at least two substantially planar grids and means for reversibly interlocking said grids together so as to form a trough for suspending the food product wherein each of the grids comprises a forward portion and a rearward portion, said portions being separated by said interlocking means, wherein when the grids are interlocked the rearward portions form the trough and the forward portions form a base supporting the trough.

4,996,405

INDUCTIVE HEATED PORTABLE HOT PLATE

Michel Poumey, Ecully, and Jacques Charvet, Voiron, both of France, assignors to Cableco and Establissements Jean Charvet, both of, France

Filed Apr. 17, 1990, Ser. No. 510,048
Claims priority, application France, Apr. 18, 1989, 89 05378
Int. Cl.[5] H05B *6/12*
U.S. Cl. 219—10.493 **8 Claims**



1. A portable inductively heated electric hotplate and an inductive heating power source comprising, in combination,

a power source primary induction coil member connected to a source of AC electric power,

a glass ceramic plate mounted adjacent said primary induction coil to form a surface on the power source for receiving thereon a portable electric hotplate;

a portable electric hotplate having an outer heat conductive hotplate casing;

a casing top member forming a heating surface;

a base member made of an electrically insulating material;

at least one electrical resistor mounted adjacent said top

casing member connected to a secondary electric circuit formed within said portable hotplate, said secondary electric circuit having a secondary induction coil member mounted adjacent said base member, connected in parallel with a capacitor;

said primary and secondary induction coil members being adapted to form a magnetic circuit for transfer of electromagnetic energy when said portable hotplate is positioned on said power source glass ceramic plate; and

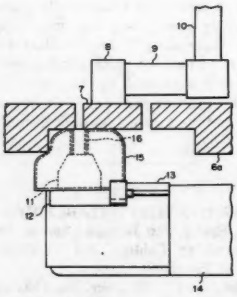
the values for the inductance of the secondary-inductance coil and for the capacitance of the capacitor in the secondary circuit being selected such that the oscillating circuit thus defined in the secondary circuit has a resonant frequency higher than that of the primary induction circuit of the heating power source.

4,996,406

CORE RETAINING APPARATUS FOR WIRE-CUT ELECTRO-DISCHARGE MACHINE

Yoshiro Nakayama, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 22, 1990, Ser. No. 497,176
Claims priority, application Japan, Mar. 31, 1989, 1-80573
Int. Cl.[5] B23H *7/02*
U.S. Cl. 219—69.12 **11 Claims**



11. A wire-cut electro-discharge machine for machining a workpiece by virtue of an electro-discharge occurring between a wire electrode and said workpiece, said machine characterized in comprising:

a lower fluid supply nozzle disposed under said workpiece with said wire electrode passed therethrough for supplying a dielectric fluid between said wire electrode and said workpiece,

means movable between a machining area above said workpiece and a non-machining area for carrying out a core cutout of said workpiece from said machining area,

core retaining means disposed in the vicinity of said lower dielectric fluid supply means for retaining said core so that said core does not fall, said core retaining means being elastic and having a space therein, and

pressure control means for controlling the pressure inside said space to a desired value to hold said core in place.

4,996,407

PLASMA ARC TRANSFER CONTROLLER

John C. Traxler, Sarasota, Fla., assignor to HyperPower, Inc., Sarasota, Fla.

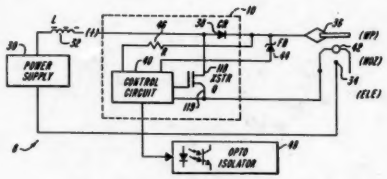
Filed Apr. 3, 1989, Ser. No. 332,591
Int. Cl.[5] B23K *9/00*
U.S. Cl. 219—121.54 **28 Claims**

1. An apparatus for controlling transfer of a plasma arc originating at a cathode between a first and a second anode, said apparatus comprising:

means for providing an electrical current to said first anode,

means for sensing a voltage difference between said first and said second anode, and

transfer control means, responsive to said voltage differential, for providing (a) all current to said first anode when said voltage differential is less than a specified value X, (b) all current to said second anode when said voltage differ-



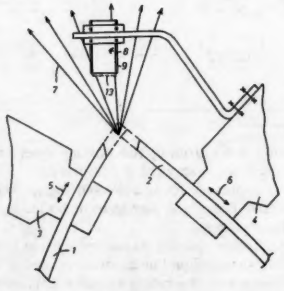
ential exceeds a specified value Y, where Y is greater than X, (c) an increasing portion of said current to said second anode as said voltage difference increases between X and Y, and (d) an increasing portion of said current to said first anode as said voltage differential decreases between X and Y.

4,996,408

PROXIMITY SWITCH FOR USE IN WELDING FACILITIES

Werner Turck, Halver, and Hans Schumacher, Werdohl, both of Fed. Rep. of Germany, assignors to Werner Turck GmbH & Co., KG, Halver, Fed. Rep. of Germany

Filed Nov. 1, 1989, Ser. No. 430,014
Claims priority, application Fed. Rep. of Germany, Mar. 17, 1989, 3908821; Apr. 8, 1989, 3911598
Int. Cl.[5] B23K *9/10*
U.S. Cl. 219—130.01 **5 Claims**

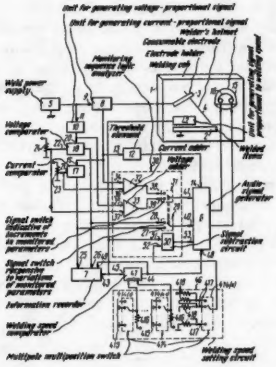


1. An electronic proximity switch means adapted to be operated in a non-contact mode for use in a welding zone of a welding means, the electronic proximity switch means including a brass housing, a ceramic disc provided on a responsive-sensitive end face of said switch means, and a coating of anti-stick material provided on a surface of the ceramic disc facing the welding means and on at least a front area of the housing facing the welding means for preventing a formation of a layer of material resulting from a welding operation on the ceramic disc and at least a front area of the housing.

4,996,409
ARC-WELDING MONITOR

Boris E. Paton, ulitsa Chkalova, 41a, kv.26; Vsevolod V. Vasiliev, prospekt 40-letia Oktyabrya, 82, kv.60; Valentin A. Bogdanovsky, Laboratorny pereulok, 22, kv.10; Konstantin V. Shelekhov, Saratovskaya ulitsa, 14/9, kv.31; Viktor M. Gavva, prospekt Marshala Koshevogo, 22, kv.117, all of Kiev; Vladimir D. Bigdash, Vasilkovsky raion, poselok Glevakha, Lesnaya ulitsa, 73, Kievskava oblast; Ivan A. Tabunschik, prospekt Chubarya, 36b, kv.12., and Andrei P. Ilchishin, pereulok Schorsa, 5a, kv.2, both of Kiev, all of U.S.S.R.

Filed Aug. 25, 1989, Ser. No. 398,829
Int. Cl.[5] B23K *9/095*
U.S. Cl. 219—130.01 **37 Claims**

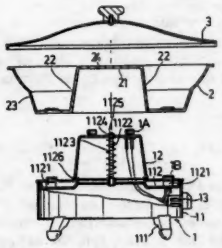


1. An arc-welding monitor comprising:
a weld power supply having an output;
an audio-signal generator having first, second, third and fourth inputs and an output and generating audio signals dependent on arc-welding parameters;
a unit for generating a signal proportional to welding current, which has an output and an input connected to said output of said weld power supply;
a welding current comparator having a first input, a second input and an output; said first input connected to said output of said unit for generating a signal proportional to welding current; said second input receiving welding current setting signals;
a unit for generating a signal proportional to welding voltage, which has an output and an input connected to said output of said weld power supply;
a welding voltage comparator having a first input, a second input and an output; said first input connected to said output of said unit for generating a signal proportional to welding voltage; said second input receiving welding voltage setting signals;
a monitoring sequence logic analyzer having a group of inputs, first and second outputs; said group of inputs of said logic analyzer connected to said output of said welding current comparator and to said output of said welding voltage comparator; said logic analyzer comprising:
a first signal switch responsive to variations of monitored parameters, having a group of inputs serving as said inputs of said logic analyzer and an output serving as said first output of said logic analyzer and connected to said first input of said audio-signal generator;
a second signal switch responsive to incremental changes in monitored signals, having a group of inputs and an output serving as said second output of said logic analyzer and connected to said second input of said audio-signal generator;
a welding current adder having a first input connected to said output of said unit for generating a signal proportional to welding current, a second input combined with said second input of said welding current comparator, and an output connected to one of said group of inputs of said second signal switch;
a welding voltage adder having a first input connected to said output of said unit for generating a signal proportional to welding voltage, a second input combined with said second input of said welding voltage comparator, and an output connected to one of said g.oup of inputs of said second signal switch;
a first threshold element having an input connected to said output of said unit for generating a signal proportional to welding current, and an output connected to said third input of said audio-signal generator;
an information recorder having a first input connected to said output of said welding current comparator, a second input connected to said output of said welding voltage comparator, a third input and a fourth input; said recorder receiving signals indicative of variations of monitored parameters and of incremental changes in arc-welding parameters;
a welding operator's helment provided with a playback means connected to said output of said audio-signal generator and receiving, concurrently with said recorder, audio signals to effect audio monitoring of the arc-welding process.

4,996,410
DUAL PURPOSE CHAFING POT

Chung-Kuo Ho, 6th Floor, No. 137-6, Yu Hsi St., Yungho, Taipei Hsien, Taiwan

Filed Feb. 27, 1990, Ser. No. 485,912
Int. Cl.[5] F27D *11/00*
U.S. Cl. 219—432 **4 Claims**

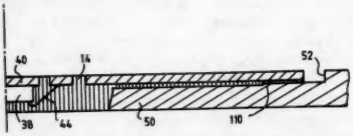


1. An electric chafing pot having a base portion to provide heat and a pan for containing food detachable from said base portion, comprising:
a lower heating plate formed on said base;
a convex structure movably mounted in the center of said base;
an upper heating plate formed atop said convex structure;
said pan for containing food formed as a ring having a concavity formed in the middle of a bottom surface thereof to receive said convex structure of said base portion, said concavity having a top plate, said convex structure being biased by a spring support to tightly hold said top plate of said concavity to said upper heating plate enabling the pan to be supported by the upper and lower heating plates simultaneously.

4,996,411
METHOD OF MANUFACTURING A CARD HAVING ELECTRONIC MEMORY AND A CARD OBTAINED BY PERFORMING SAID METHOD

Alain Rebjock, Cergy, France, assignor to Schlumberger Industries, Montrouge, France

Filed Jul. 20, 1987, Ser. No. 75,485
Claims priority, application France, Jul. 24, 1986, 86 10753
Int. Cl.[5] G06K 19/02
U.S. Cl. 235—488 12 Claims



1. The method of manufacturing an electronic memory card, comprising the steps of:

(a) providing a solid sheet element of electrically conductive material having a substantially planar set of electrical conductors which will be used to define electrical connections and external contact tabs for said memory card, said substantially planar set of electrical conductors having a first face and a second face;

(b) forming slots through said sheet element in order to define and separate conductive zones forming said electrical connections and said external contact tabs from one another, while leaving material which forms interconnecting bridges at the periphery of said sheet element between said conductive zones in order to hold said conductive zones together;

(c) fixing a semiconductor chip directly to said first face of said substantially planar set of electrical conductors in order to form an electronic module;

(d) providing a card body having a first main face and a second main face, said main faces being substantially mutually parallel, said card body having a housing which opens out at least into said first main face, said housing having a size and shape which is suitable for receiving said electronic module;

(e) placing said electronic module into said housing so that said second face of said substantially planar set of electrical conductors lies substantially in the same plane as said first main face of said card body;

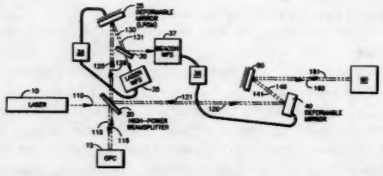
(f) fixing said electronic module to said card body; and

(g) cutting said interconnecting bridges in order to electrically isolate said conductive zones from one another.

4,996,412
OPTICAL SYSTEM FOR WAVEFRONT COMPENSATION

David Anafi; John H. Mitchell, both of West Palm Beach, and Harold B. Schall, Palm Beach Gardens, all of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 7, 1989, Ser. No. 447,317
Int. Cl.[5] G01J 1/20
U.S. Cl. 250—201.9 5 Claims



1. An optical system for controlling an optical beam train that transports a laser beam from a laser and directs said laser beam through the atmosphere at a target, comprising a first deformable mirror, disposed along a sample beam path of a first sample beam from said laser beam, for modifying said first sample beam, a laser beam sensor disposed to receive said first sample beam after reflection from said first deformable mirror, for detecting a phase front representative of said laser beam, an incoming beam sensor for detecting a phase front representative of an incoming beam entering said optical system after passage through the atmosphere, laser beam control means coupled to said laser beam sensor and to said first deformable mirror for controlling said first deformable mirror to compensate for errors in said phase front of said laser beam, and incoming beam control means coupled to said incoming beam sensor and to a second deformable mirror for controlling said second deformable mirror to compensate said laser beam for perturbations in the atmosphere;

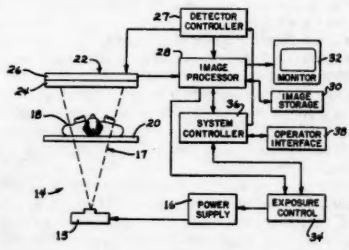
in which optical system, beam sampling means for deflecting said first sample beam from said laser beam and a second sample beam from said incoming beam combine to direct both said first and said second sample beams on said first deformable mirror and thence to said laser beam sensor and said incoming beam sensor respectively, whereby said laser beam sensor and said incoming beam sensor both detect radiation reflected from and modulated by said first deformable mirror; and

said laser beam control means adjusts said first deformable mirror to compensate for errors in said laser beam, thereby impressing a compensating configuration on said first deformable mirror and a corresponding modulation on said second sample beam, so that said incoming beam control means controls said second deformable mirror in response to both said second sample beam and to said corresponding modulation.

4,996,413
APPARATUS AND METHOD FOR READING DATA FROM AN IMAGE DETECTOR

David L. McDaniel, Dousman, and Scott W. Petrick, New Berlin, both of Wis., assignors to General Electric Company, Milwaukee, Wis.

Filed Feb. 27, 1990, Ser. No. 485,661
Int. Cl.[5] H01J 40/14
U.S. Cl. 250—208.1 19 Claims



1. A method for reading image data from an array of photodetectors arranged in rows and columns comprising:

(a) sensing signals from the photodetectors in at least one row substantially at the center of the array;

(b) sensing signals from the photodetectors in at least one row on one side of a row from which signals were sensed during step a;

(c) sensing signals from the photodetectors in at least one row on the other side of a row from which signals were sensed during step a; and

(d) repeating steps b and c until signals from all of the rows of photodetectors have been sensed.

4,996,414

X-RAY IMAGE INTENSIFIER WITH ELECTRON OPTICS COATING

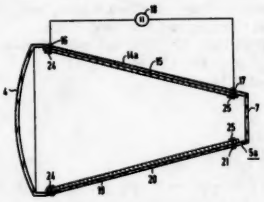
Richard Frank, Erlangen, and Fritz-Walter Hofmann, Buckenhof, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 22, 1989, Ser. No. 413,744

Claims priority, application Fed. Rep. of Germany, Sep. 29, 1988, 8812346[U]

Int. Cl.[5] H01J *31/50*

U.S. Cl. 250—213 VT 5 Claims



1. An x-ray image intensifier comprising:

an input luminescent screen with a photocathode,

an output luminescent screen;

a one-piece electrode substrate disposed between said input luminescent screen and said output luminescent screen and being attached vacuum tight thereto to form a vacuum vessel; and

electrode for an electron optics system consisting of electrical resistance material and forming a coating on a circumferential interior surface of said electrode substrate, said coating completely covering an area between said input luminescent screen and said output luminescent screen over the entire circumference of said interior surface and adapted for connection to a voltage source so that a potential field generated in a region in said vessel between said input luminescent screen and said output luminescent screen and said output luminescent screen continuously increases with increasing distance from said input luminescent.

4,996,415

APPARATUS FOR DETECTING THE PRESENCE AND POSITION OF AN OBJECT

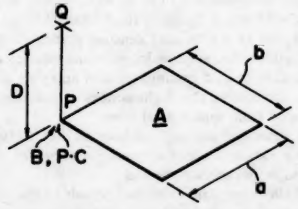
Hirokazu Tanaka; Kiyomitsu Ishikawa, and Tohru Tanabe, all of Tokyo, Japan, assignors to Stanley Electric Corporation, Tokyo, Japan

Filed Sep. 22, 1988, Ser. No. 247,849

Claims priority, application Japan, Sep. 22, 1987, 62-236209

Int. Cl.[5] G01V *9/04*

U.S. Cl. 250—221 7 Claims



1. A photoelectric detector comprising first and second light sources having, respectively, different light emitting areas, and disposed to illuminate a common region of an object to be detected, photoelectric transducer means adapted to receive the light emitted from said first and second light sources and then reflected by the object, and a signal processing circuit functioning to separately process electric signals corresponding to said first and second light sources from an output of said photoelectric transducer means and to compare these two separately processed electric signals to each other so that presence or absence, and a position, of the object are detected on the basis of such comparison of said two electric signals, wherein each electric signal has a value representative of the intensity, at said transducer means, of light emitted by a respective light source and reflected by the object, and said signal processing circuit compares the intensity-representing values of the two signals.

4,996,416

OPTICAL DETECTION SYSTEM WITH MEANS FOR EQUALIZING AMBIENT LIGHT LEVELS AT MULTIPLE DETECTORS

Raymond J. Chaney, Berkeley, United Kingdom, assignor to Renishaw plc, United Kingdom

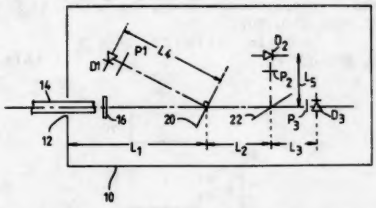
PCT No. PCT/GB88/00628, § 371 Date Mar. 24, 1989, § 102(e) Date Mar. 24, 1989, PCT Pub. No. WO89/01612, PCT Pub. Date Feb. 23, 1989

PCT Filed Jul. 29, 1988, Ser. No. 340,420

Claims priority, application United Kingdom, Aug. 7, 1987, 8718803

Int. Cl.[5] G01J *9/02*

U.S. Cl. 250—225 8 Claims



1. An optical detection system for providing information from a coherent light beam, comprising an ambient light limiting enclosure housing a plurality of photo-detectors and having an aperture in a wall thereof for receiving the coherent light beam, wherein the detectors are positioned at different places within the enclosure and an acceptance cone angle of light from said aperture is the same for each detector whereby a proportion of ambient light to coherent light reaching each detector is equalized.

4,996,417

COLOR FILTER DEVICE

Kohji Shinomiya, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 7, 1989, Ser. No. 403,878

Claims priority, application Japan, Jun. 13, 1989, 1-150883

Int. Cl.[5] G01J *3/50*

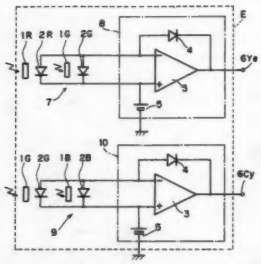
U.S. Cl. 250—226 10 Claims

1. A color filter device comprising,

a plurality of color filter elements each of which has individual filtering characteristic,

a photoelectric transfer circuit having a plurality of photodiodes electrically connected in paralled in pairs with said plurality of color filter elements, for synthesizing photoelectric currents caused by photoelectric transfer of the

photodiodes and for outputting a resultant photoelectric current,



a current-voltage transfer circuit for transferring a current of a signal outputted from said photoelectric transfer circuit into a voltage thereof.

4,996,418

WIDE RANGE FIBER OPTICAL DISPLACEMENT SENSOR

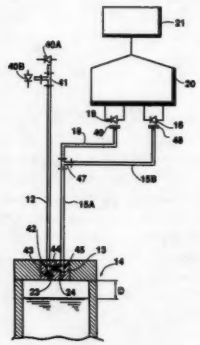
Katsuharu Iwamoto, Yokohama; Osamu Kawakami, Yokosuka, and Hideo Miyagawa, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation-in-part of Ser. No. 127,983, Dec. 3, 1987. This application Aug. 28, 1989, Ser. No. 399,113

Claims priority, application Japan, Jan. 7, 1987, 62-000501; Dec. 27, 1988, 63-327901

Int. Cl.[5] H01J *5/16*

U.S. Cl. 250—227.11 **18 Claims**



1. A fiber optical displacement sensor for measuring displacement of a surface to be measured, comprising:

at least one light source means for providing a projection beam to be projected onto the surface to be measured and a reference beam which carries no information related to the displacement to be measured;

at least one projecting optical fiber for transmitting the projection beam to a vicinity of the surface to be measured and the reference beam;

at least one receiving optical fiber for transmitting a reflected beam resulting from reflection of the projection beam by the surface to be measured which carries information related to the displacement to be measured;

collimation means, attached to ends of the projecting and receiving optical fibers, for collimating the projection beam to be emitted from an end of the projecting optical fiber facing toward the surface to be measured and the reflected beam to be received by an end of the receiving optical fiber facing toward the surface to be measured;

at least one beam conversion means for converting the reflected beam and the reference beam into corresponding electrical signals; and

means for deriving the displacement to be measured in accordance with the corresponding electrical signals.

4,996,419

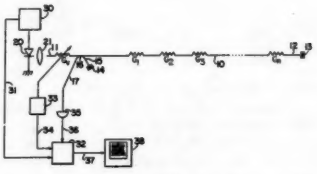
DISTRIBUTED MULTIPLEXED OPTICAL FIBER BRAGG GRATING SENSOR ARRANGEEMENT

William W. Morey, West Hartford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 26, 1989, Ser. No. 456,441

Int. Cl.[5] H01J *5/16*

U.S. Cl. 250—227.18 **13 Claims**



1. An arrangement for determining the magnitudes of selected physical quantities at a multitude of spaced locations, comprising

an elongated optical fiber having a waveguiding core and including a multitude of separate longitudinally spaced Bragg sensing gratings of substantially identical initial periodicity for all of said sensing gratings, each of said sensing gratings being situated at a different one of the locations;

means for applying to said optical fiber longitudinal stresses the magnitude of which at each of the locations is dependent on the extent of deviation of the magnitude of the respective physical quantity being monitored at that particular location from its initial value, with attendant change in said periodicity;

means for launching light pulses into said core for propagation longitudinally thereof and for return from any of said sensing gratings of a detectable light echo at a central wavelength determined by instantaneous value of said periodicity of the respective sensing grating when the wavelength of the light reaching said respective sensing grating at least momentarily coincides with said central wavelength thereof;

means for so controlling the wavelength at which said launching means issues light as to coincide, at different times of a detection cycle, with at least all of said central wavelengths at which said sensing gratings return said echoes within the range of longitudinal stresses expected to be applied to said gratings by said applying means;

means for conducting said light echoes to a detecting location spaced from said optical fiber;

means for detecting said light echoes as they arrive at said detecting location and for issuing a series of detection signals in response thereto; and

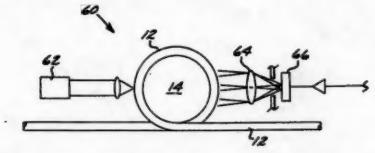
means for allocating said detection signals to the respective sensing gratings on the basis of time intervals elapsed between the issuance of the respective light pulses and the arrival of said echoes responsive thereto at said detecting means, and to the respective longitudinal stresses applied by said applying means to said respective sensing gratings on the basis of the respective wavelengths of said light pulses in response to which said respective gratings return said echoes.

4,996,420

MEASUREMENT OF OPTICAL ATTENUATION ALONG THE LENGTH OF BENT OPTICAL FIBERS

Gary R. Redford, Tucson, Ariz., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Oct. 5, 1989, Ser. No. 417,370
Int. Cl.[5] H01J 5/16; G01N 21/00
U.S. Cl. 250—227.24 15 Claims



8. A process for simulating and measuring the optical signal attenuation of an optical fiber resulting from the introduction of curvature into the optical fiber during use, comprising the steps of:

bending a segment of a length of an optical fiber in a curved shape;

measuring the loss of transmitted light energy resulting from the curvature produces by the bending;

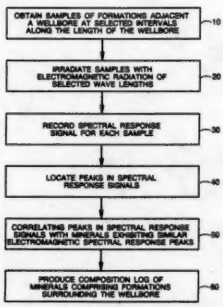
passing the length of the optical fiber progressively over the curved shape to bend successive segments of the optical fiber, while continuing to measure the loss of light energy from the optical fiber.

4,996,421

METHOD AND SYSTEM OF GEOPHYSICAL EXPLORATION

Chandra S. Rai, and Carl H. Sondergeld, both of Tulsa, Okla., assignors to Amoco Corporation, Chicago, Ill.

Filed Oct. 31, 1988, Ser. No. 264,926
Int. Cl.[5] G01N 21/35
U.S. Cl. 250—255 14 Claims


OBTAIN SAMPLES OF FORMATIONS ADJACENT A WELLBORE AT SELECTED INTERVALS ALONG THE LENGTH OF THE WELLBORE
10
IRRADIATE SAMPLES WITH ELECTROMAGNETIC RADIATION OF SELECTED WAVE LENGTHS
20
RECORD SPECTRAL RESPONSE SIGNAL FOR EACH SAMPLE
30
LOCATE PEAKS IN SPECTRAL RESPONSE SIGNALS
40
CORRELATING PEAKS IN SPECTRAL RESPONSE SIGNALS WITH MINERALS EXHIBITING SIMILAR ELECTROMAGNETIC SPECTRAL RESPONSE PEAKS
50
PRODUCE COMPOSITION LOG OF MINERALS COMPRISING FORMATIONS SURROUNDING THE WELLBORE
60

1. A method of evaluating the composition of minerals comprising the formations surrounding a wellbore, comprising the steps of:

(a) obtaining a plurality of core samples of the earth's formations at selected intervals, corresponding to the minimum resolution interval of a selected geophysical method of survey, along the wellbore length;

(b) irradiating a portion of each core sample with electromagnetic radiation and recording a spectral absorption response signal representative of the electromagnetic radiation absorbed by said portion of each core sample;

(c) locating peaks in each spectral absorption response signal;

(d) identifying minerals in each core sample by correlating the peaks in each spectral absorption response signal with minerals exhibiting similar electromagnetic characteristic peaks; and

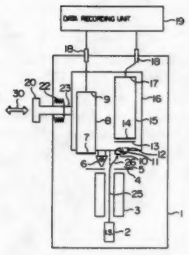
(e) producing a composition log of the minerals comprising the formations surrounding a wellbore along its length.

4,996,422

MASS SPECTROMETER

Yasuhiro Mitsui, Fuchu; Keiji Hasumi, Iruma; Shinichiro Watase; Katsumi Kuriyama, both of Koganei, and Kazuo Nakano, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Tokyo Electronics Co., Ltd., Ome, both of, Japan

Filed Jun. 1, 1989, Ser. No. 360,107
Claims priority, application Japan, Jun. 1, 1988, 63-132765
Int. Cl.[5] H01J 44/06
U.S. Cl. 250—281 11 Claims



2. A mass spectrometer comprising:

mass separation means for separating ions in accordance with the mass of the ions and emitting the separated ions, wherein the emitted ions comprise at least one of positive ions and negative ions;

electron-multiplier means for detecting positive ions emitted from the mass separation means; and

photo-multiplier means for detecting negative ions emitted from the mass separation means;

wherein the electron-multiplier means detects the positive ions emitted from the mass separation means at an optimum positive ion detecting position; and

wherein the photo-multiplier means detects the negative ions emitted from the mass separation means at an optimum negative ion detecting position;

the mass spectrometer further comprising:

ion deflection means for deflecting the positive ions emitted from the mass separation means to the optimum positive ion detecting position, and for deflecting the negative ions emitted from the mass separation means to the optimum negative ion detecting position.

4,996,423

CHOP MODE OPERATED MASS SPECTROMETER FOR REDUCING THE EFFECT OF LINE SIGNALS

David A. Hanna, Boulder, Colo., assignor to Paradygm Science & Technologies, Inc., Boulder, Colo.

Filed Jun. 4, 1990, Ser. No. 532,448
Int. Cl.[5] H01J 49/02
U.S. Cl. 250—281 14 Claims

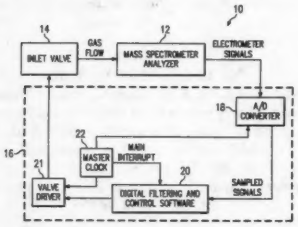
1. A chop mode mass spectrometer comprising:

an analyzer body for processing a sample of a gas and providing a signal representative of the degree to which at least one type of molecule is present in said sample;

a valve for admitting said sample into said analyzer body, said valve being capable of periodic operation;

means for driving said valve at a first defined frequency, wherein said first defined frequency is a sub-multiple of a line frequency; and

means for processing said signal to detect the component of said signal corresponding to said sub-multiple of a line frequency and reject the component corresponding to said line frequency.

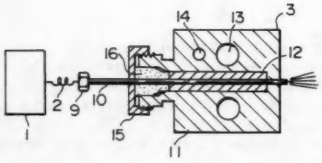


4,996,424

ATMOSPHERIC PRESSURE IONIZATION MASS SPECTROMETER

Tadao Mimura, Katsuta, and Yoshiaki Kato, Mito, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 3, 1990, Ser. No. 531,247
Int. Cl.[5] H01J *49/04*
U.S. Cl. 250—288 **8 Claims**



1. An atmospheric pressure ionization mass spectrometer, comprising:

an atomization section for heating and atomizing a sample carried by a mobile phase;

an ionization section for ionizing the atomized sample; and

a mass spectrometric analysis section for determining a mass of the ionized sample; and

said atomization section including a sample introducing pipe means provided therein with a plurality of thin holes for introduction of the sample for atomization, said thin holes extending along an axis of said sample introducing pipe means.

4,996,425

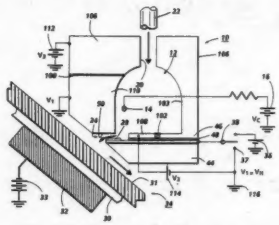
METHOD AND APPARATUS FOR INCREASING CORONA EFFICIENCY IN AN IONOGRAPHIC IMAGING DEVICE

Oscar G. Hauser, Rochester; Robert W. Anderson, Fairport, and Lawrence M. Hart, Ontario, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 10, 1989, Ser. No. 391,742
Int. Cl.[5] H01T *19/00*
U.S. Cl. 250—325 **19 Claims**

1. In an ionographic imaging device including an ionographic head for depositing an image pattern of ions on an imaging surface, the ionographic head including an ion source held within an ion chamber formed in the head, a modulation channel extending generally from the ion chamber towards the imaging surface, through which ions pass in a stream for imagewise modulation prior to deposit on the imaging surface, and means for enhancing the efficiency of said ion source to increase the proportion of ions generated at the ion source that are directed through said modulation channel, said enhancing means comprising:

means for segmenting the head into a plurality of head regions, each region forming a portion of the ion chamber;



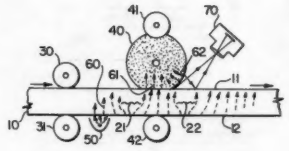
means for providing a voltage potential on each region, the voltage on each region selected so that the magnitude of an electric field extending outwardly from the ion source within the ion chamber is greatest in the direction of the modulation channel.

4,996,426

DEVICE FOR SUBSURFACE FLAW DETECTION IN REFLECTIVE MATERIALS BY THERMAL TRANSFER IMAGING

Paolo G. Cielo, Montréal; Xavier Maldague, Ste-Foy, and Jean C. Krapez, Longueuil, all of Canada, assignors to National Research Council of Canada, Ottawa, Canada

Filed Sep. 11, 1989, Ser. No. 407,160
Int. Cl.[5] G01N *25/72*
U.S. Cl. 250—330 **20 Claims**



1. A thermal-imaging apparatus for the non-destructive detection in a continuously moving workpiece of sheet material comprising:

means to change the temperature of a portion of a surface of the workpiece to a temperature different from its initial equilibrium temperature,

a continuously recyclable thermal transfer device having a movable surface, which movable surface has a high infrared emissivity and a low infrared reflectivity,

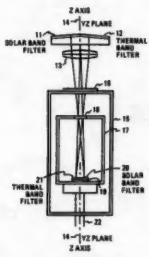
a device to press said thermal transfer device against said portion to provide good thermal contact between said movable surface and said portion whereby a thermal image of said portion is transferred to said movable surface, and

means to produce a thermal image of said portion from said movable surface of said thermal transfer device.

4,996,427
IMAGER FOR SIMULTANEOUSLY OBTAINING TWO IMAGES OF DIFFERING COLOR BANDS USING A SINGLE PHOTODETECTOR AREA ARRAY

Milton L. Noble, Liverpool, and Albert F. Milton, Syracuse, both of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Filed Dec. 26, 1989, Ser. No. 456,498
Int. Cl.[5] H01L *31/00*
U.S. Cl. 250—332 **2 Claims**



1. An IR imager for simultaneously obtaining images of differing color bands of the same object field using a single two dimensional photodetector array, comprising:

(A) optical means at ambient temperature, comprising:

(1) a biprism positioned upon the Z axis of said imager, mutually orthogonal X and Y axes being orthogonal to said Z axis, said biprism upon which IR radiation from an object field of view impinges having on one face a plane surface and on the opposite face, two aperture halves with inclined surfaces separated by the YZ plane, the angles thereof being selected to converge IR radiation from each aperture half toward the YZ plane by a predetermined amount,

(2) a first pair of IR transmission filters, one filter for selecting IR radiation of a first color band from the radiation passing through a biprism aperture half on the first side of said YZ plane, and the other filter for selecting IR radiation of a second color band from radiation passing through a biprism aperture half on the second side of said YZ plane,

(3) an objective lens arranged upon said imager (Z) axis for forming an image of the object field in said first and second color bands on a photodetector array disposed in the focal plane, and

(B) a cryogenically cooled evacuated dewar enclosing the focal plane of said objective lens, and having an IR transparent window arranged upon said imager (Z) axis for admitting IR radiation into said dewar, said dewar containing

(1) a "cold shield" having a cold aperture arranged upon said imager (Z) axis between said objective lens and said focal plane,

(2) a second pair of IR transmission filters, the first filter which intercepts radiation impinging on the portion of the photodetector array lying on the second side of the YZ plane for selecting IR of said first color band and the second filter intercepting radiation impinging on the portion of the photodetector array lying on the first side of the YZ plane for selecting IR of said second color band; and

(3) a single two dimensional IR photodetector array arranged upon said imager (Z) axis in said focal plane, with the YZ plane bisecting said array, one pair of sides of which are aligned parallel to the X coordinate dimension,

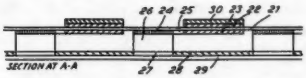
the predetermined amount of convergence displacing said color band images in mutually opposite senses by one quarter of the X coordinate dimension of said photodetector array,

said array responding to IR radiation impinging thereon after convergence and after selection by said first and second pairs of filters, the first array half on the first side of the YZ plane responding to said object field in said second color and the second array half on the second side of the YZ plane responding to said object field in said first color.

4,996,428
THERMAL IMAGING DEVICE

Roger Voles, London, England, assignor to Thorn Emi Electronics Limited, Hayes, England

Filed Jun. 1, 1989, Ser. No. 359,881
Claims priority, application United Kingdom, Jun. 1, 1988, 8812957
Int. Cl.[5] G01J *5/06, 5/02*
U.S. Cl. 250—332 **9 Claims**



1. A thermal imaging device comprising a layer of pyroelectric material and having first and second major surfaces; an array of interconnected electrodes on the first major surface of the layer; an array of discrete electrodes on the second major surface of the layer, a plurality of electrically conductive regions on the second major surface of the layer, each discrete electrode being separated from, but not substantially surrounding, a respective one of the electrically conductive regions, a plurality of elongate strips of electrically conductive material for electrically connecting respective discrete electrodes and electrically conductive regions on the second major surface; and a plurality of pillars, each extending from a respective electrically conductive region, for supporting the layer and for providing an electrically conductive path between the discrete electrodes and an electrical signal processing means via respective elongate strips and electrically conductive regions.

4,996,429
POCKET MEASURING INSTRUMENT FOR MEASURING IONIZING RADIATION

Werthmann Günter, Hemer, Fed. Rep. of Germany, assignor to Nokia Unterhaltungselektronik, Pforzheim, Fed. Rep. of Germany

Filed Oct. 31, 1989, Ser. No. 429,563
Claims priority, application Fed. Rep. of Germany, Nov. 8, 1988, 8813940[U]
Int. Cl.[5] G01T *1/16*
U.S. Cl. 250—336.1 **2 Claims**

1. An instrument, which can be carried in the pocket of a garment, for measuring ionizing radiation acting upon a person wearing the garment, said instrument comprising:

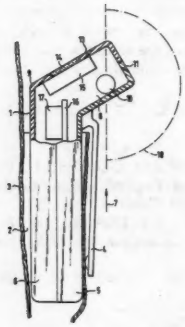
a longitudinally extending housing portion adapted to fit in a pocket;

a forwardly projecting housing portion attached to the longitudinally extending housing portion and extending forwardly at a predetermined angle from the longitudinally extending housing portion in a direction away from the person;

a radiation detector located in a forwardmost portion of the forwardly projecting housing portion;

a display unit mounted in an upwardly facing wall of one of said housing portions and facing in a direction to be readable by the person when the instrument is carried in the

pocket of a garment worn by the person, whereby the radiation detector is positioned in a forwardmost location



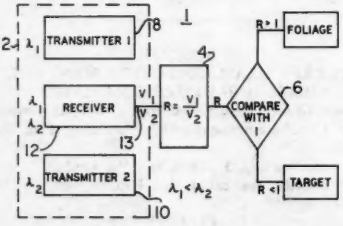
so as to receive radiation from a wide angle, unobstructed by the display unit or components in the housing.

4,996,430

OBJECT DETECTION USING TWO CHANNEL ACTIVE OPTICAL SENSORS

Neelam Gupta, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 2, 1989, Ser. No. 416,197
Int. Cl.[5] G01S *17/02*
U.S. Cl. 250—339 **12 Claims**



1. An apparatus for detecting objects which exhibit ratios of reflectance values at two separate wavelengths that are less than a predetermined value comprising:

means for transmitting a first signal having a wavelength lambda-1 along a first path;

means for transmitting simultaneously with the first signal a second signal having a wavelength lambda-2 where lambda-2 is different than lambda-1 along a second path which substantially intersects the first path at a single predetermined region along the first path;

means for sensing the first signal and second signal reflected off an object when the object becomes located substantially at the single predetermined region; and

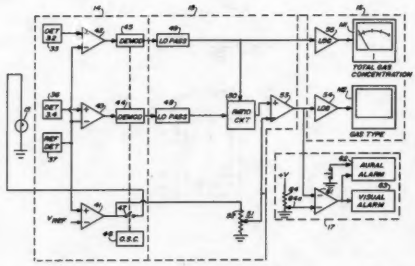
means for indicating when the object has a ratio of reflectance values calculated from the reflected first and second signals that is less than the predetermined value.

4,996,431

SELECTIVE GAS DETECTING APPARATUS

Ulrich Bonne, Hopkins, and Robert J. Matthys, Minneapolis, both of Minn., assignors to Gas Research Institute, Chicago, Ill.

Filed Feb. 10, 1989, Ser. No. 308,468
The portion of the term of this patent subsequent to Sep. 18, 2007, has been disclaimed.
Int. Cl.[5] G01N *21/61*
U.S. Cl. 250—343 **20 Claims**



1. A selective gas detecting apparatus for determining a concentration and type or average type of hydrocarbon gas in a gas sample based upon absorption of infrared radiation by the gas sample, comprising: means for passing infrared radiation through the gas sample, infrared radiation detecting means for detecting infrared radiation passed through the gas sample and producing in a first signal channel a first measurement signal indicative of a first wavelength absorbed by the gas sample, and producing in a second signal channel a second measurement signal indicative of a second wavelength absorbed by the gas sample, processing circuit means including first circuit means responsive to said first measurement signal for providing a first output signal corresponding to a first total concentration of hydrocarbons in the gas sample, second circuit means responsive to said second measurement signal for providing a second output signal corresponding to a second total concentration of hydrocarbons in the gas sample, ratio determining means responsive to said first and second output signals for providing a ratio signal corresponding to the ratio of said first and second output signals, said ratio signal being indicative of the type or average type of hydrocarbon gas, and display means responsive to said first output signal and said ratio signal for providing an indication of the concentration and type or average type of hydrocarbon gas in the gas sample, respectively.

4,996,432

RADIATION DETECTOR

Satoshi Saitou, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 29, 1987, Ser. No. 102,489
Claims priority, application Japan, Sep. 30, 1986, 61-233470
Int. Cl.[5] G01T *1/24*
U.S. Cl. 250—370.01 **8 Claims**

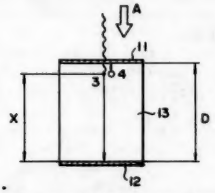
1. A radiation detector comprising:

a semiconductor block made of semiconductor crystal material for converting incident photons into electrical charges, which has a first surface and a second surface, the second surface disposed opposite the first surface;

a first electrode fixed to the first surface, said first electrode being at least partially transparent to incident photons and means for connection to a ground for allowing the photons to pass therethrough into the semiconductor block; and

a second electrode fixed to the second surface, said second

electrode including means for connection to a positive high voltage, and wherein



a distance D between said first and second electrodes is determined by $D >> 1/\mu_f$

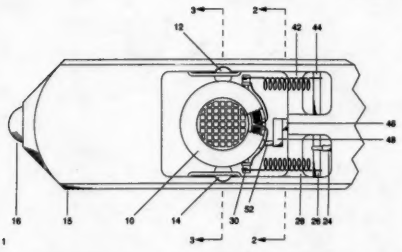
where μ_f is absorption coefficient of the detector.

4,996,433

SPECIMEN HEATING HOLDER FOR ELECTRON MICROSCOPES

Joseph S. Jones, Pleasanton, and Peter R. Swann, Diablo, both of Calif., assignors to Gatan, Inc., Pleasanton, Calif.

Filed Nov. 6, 1989, Ser. No. 431,402
Int. Cl.[5] H01J *37/20*
U.S. Cl. 250—443.1 **4 Claims**



1. An electron microscope specimen heating holder including:

(a) a specimen cradle within an orifice in the tip of the holder,

(b) bearing means retaining said specimen cradle within said orifice,

(c) tilting means whereby said specimen cradle may be tilted about an axis perpendicular to the long axis of the holder,

(d) a heater in good thermal contact with said specimen cradle, said heater being electrically connected to a first electrically isolated bushing and to a second electrically isolated bushing, the bushings being mounted on said specimen cradle,

(e) means to supply electrical current to a pair of electrically isolated pins mounted in the tip of the holder adjacent to said specimen cradle,

(f) a first spring having a first end hooked over one of the electrically isolated pins and a second end hooked over said first electrically isolated bushing, the length of said first spring being such that it is always in tension, and

(h) a second spring having a first end hooked over the second of the electrically isolated pins and a second end hooked over said second electrically isolated bushing, the length of said second spring being such that it is always in tension,

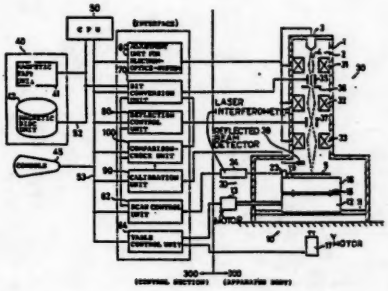
whereby when said specimen cradle is tilted by said tilting means the connections between the springs and the bushings, and the between the springs and the pins slide freely while maintaining good electrical contact thereby avoiding bending of the springs.

4,996,434

ELECTRON-BEAM LITHOGRAPHIC APPARATUS

Katsuji Tanaka, Numazu, Japan, assignor to Toshiba Machine Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 71,037, Jul. 8, 1987, abandoned. This application Apr. 20, 1989, Ser. No. 341,259
Claims priority, application Japan, Jul. 9, 1986, 61-161709
Int. Cl.[5] H01J *37/30*
U.S. Cl. 250—492.3 **12 Claims**



1. An electron-beam lithographic apparatus for exposing a plate to an electron beam which is selectively blanked on the basis of a set of design data, thereby writing a predetermined pattern over said plate to form a mask, and for checking the resultant mask, comprising:

image pattern data generating means for generating design pattern data indicative of a desired pattern for said plate;

means for exposing said plate using said design pattern data;

image detecting means for detecting electrons reflected from a mask disposed in place of said plate to pick up an image of a pattern formed on said mask;

picked up image data detecting means for receiving multiple bit digital picked-up image data from an output of said image detecting means in correspondence with said design pattern data; and

comparison-check means for automatically detecting a defect in said pattern formed on said mask, by comparing said design pattern data with said picked-up image pattern data, so that said mask is checked while said electron beam is being scanned,

wherein said comparison-check means includes:

multiple-bit pattern data generating means, storing sensitivity characteristic data which is indicative of a sensitivity of said image detecting means, for superimposing said design pattern data and said sensitivity characteristic data and generating multiple-bit digital design pattern data,

an image memory for storing therein multiple-bit image pattern data supplied from said picked-up image data detecting means; and

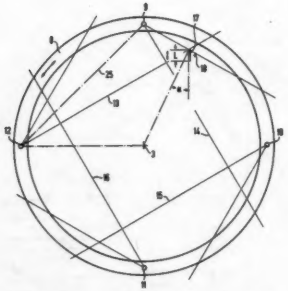
comparator means for comparing bits of said multiple bit digital design pattern data from said multiple bit pattern data generating means and said multiple bit digital picked-up image data from aid image memory, and for determining that no defect exits when said bits of said multiple bit digital design pattern data and said bits of said multiple bit digital picked-up image data agree.

4,996,435

OPTICAL SYSTEM FOR TRANSMITTING DATA BETWEEN A STATIONARY PART AND A ROTATING PART

Walter Keller, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 18, 1989, Ser. No. 451,800
Claims priority, application European Pat. Off., Feb. 6, 1989, 89102032
Int. Cl.[5] G02B *27/00*
U.S. Cl. 250—551 **3 Claims**



1. An optical data transmission system for transmitting data between a rotating part and a stationary part comprising:

a plurality of light transmitters arranged on a circle on said rotating part, each light transmitter emitting a thin, fan-shaped light-beam in a fan plane disposed in a plane defined by said circle or a plane parallel thereto, and each of said fan-shaped light beams having a central ray defining an angle with a radius of said circle intersecting an associated light transmitter; and

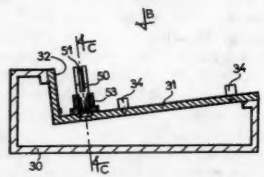
a light receiver disposed on said stationary part relative to said light transmitters so that light from at least one light transmitter is incident on said receiver at every position of said rotating part so that, given constant transmitted signals from said light transmitters during rotation of said rotating part, said light receiver generates a constant output signal.

4,996,436

AUTOMATIC APPARATUS FOR CONTROLLING THE SIZE OF WAFER-SUPPORTING BOATS

Jean P. Doeuvne, and Guy Mascarin, both of Meylan, France, assignors to French State represented by the Minister of Post, Telecommunications and Space, France

Filed Mar. 6, 1990, Ser. No. 487,899
Claims priority, application France, Mar. 7, 1989, 89 03422
Int. Cl.[5] G01N *21/86*
U.S. Cl. 250—560 **8 Claims**



1. An apparatus for controlling the size of a wafer-supporting boat such that the wafers maintained by the boat have to be positioned at predetermined distances from at least two specific utmost faces of said boat, comprising:

a slanted plane surface (31),

two reference surfaces (32),

guiding means (34) arranged in order that, when the boat is laid on said slanted plane surface, it may slide on it in such a way that said utmost faces normally abut against said reference surfaces,

at least one plane (50) provided with at least one reference groove portion (51) arranged so as to prolong according to their plane grooves supporting a wafer at a determined position,

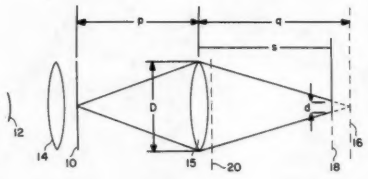
whereby, when the utmost faces are abuting against said reference surfaces, a wafer can be inserted in its supporting grooves, and in the reference groove only if the size of the boat corresponds to a standard determined by the relative distances between the reference surfaces and the reference groove.

4,996,437

OPTICAL CLUTTER SCENE SIMULATOR

Roy W. Hendrick, Jr., Goleta, Calif., assignor to Mission Research Corporation, Santa Barbara, Calif.

Filed Oct. 25, 1988, Ser. No. 262,510
Int. Cl.[5] G01D *18/00*
U.S. Cl. 250—252.1 **17 Claims**



1. A system for generating a scene representing optical clutter of an atmospheric disturbance for testing the efficiency of object detecting sensors comprising:

a display source scene means;

means for projecting said display source scene means;

means focusing the projected display source scene means at a focal plane;

correlation function control means for producing an optical clutter display from said display source scene means on a plane displaced from said focal plane, whereby the effects of noise in generating said optical clutter display are substantially eliminated.

4,996,438

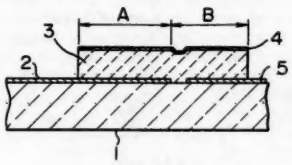
LINE IMAGE SENSOR WITH CONTROLLED PHOTOSENSITIVITY

Tatsuya Nagata, Niihari; Michihiro Watanabe, Tsuchiura; Eiichi Hara, and Takehiko Yamada, both of Chigasaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 15, 1989, Ser. No. 393,955
Claims priority, application Japan, Aug. 24, 1988, 63-208391
Int. Cl.[5] H01J *40/14*
U.S. Cl. 250—211 R **4 Claims**

1. A photoelectric transfer element comprising a substrate, a bottom electrode provide don said substrate, a photoconductive film provided on said bottom electrode, and a top transparent electrode provided on said photoconductive film, wherein

an electric field control electrode is provided to which is applied a voltage identical to the voltage applied to either said top transparent electrode or said bottom electrode which is used for photoelectric current detection.

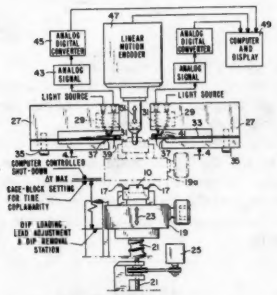


4,996,439

COPLANARITY INSPECTION MACHINE

Frank V. Linker, Springfield, Pa., assignor to American Tech Manufacturing, Corp., Glenolden, Pa.

Filed Oct. 27, 1989, Ser. No. 427,797
Int. Cl.[5] G01N *21/86*
U.S. Cl. 250—561 **32 Claims**



1. A signal device for operation on a path, comprising:

a moveable reflector aligned to move along said path;

a light source and light detector positioned to provide a signal when light from source is reflected by said reflector to said detector at a predetermined location on said path; and

comparator means for comparing the location on said path of separate signals from an object and a reference object on said path.

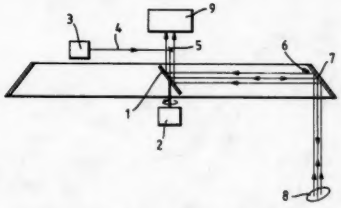
4,996,440

DEVICE FOR MEASURING DIMENSIONS

Andreas Nordbryhn, Nilserudkleiva, Norway, assignor to Tomra Systems A/S, Asker, Norway

Filed Jun. 5, 1990, Ser. No. 533,360
Claims priority, application Norway, Jun. 22, 1989, 892596
Int. Cl.[5] G01N *21/86*
U.S. Cl. 250—561 **18 Claims**

1. A device for measuring the distance to one or a plurality of regions of an object in order to be able to determine one or a plurality of dimensions of said object, a means for directing a light beam towards said object, a means for intercepting the light beams that are reflected from said object, and a means for calculating the travelling time of the beams to and from said object, characterized in a means causing the light beam to sweep across said object normally to a fixed reference plane during the entire sweeping operation, and with relative movement between the device and the object(s) to be measured, the light reflected by said object going back to an intercepting means, via said light beam sweeping means.

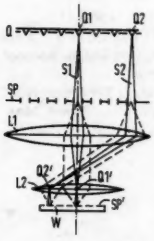


4,996,441

LITHOGRAPHIC APPARATUS FOR STRUCTURING A SUBJECT

Burkard Lischke, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 21, 1989, Ser. No. 395,976
Claims priority, application Fed. Rep. of Germany, Sep. 16, 1988, 3831526
Int. Cl.[5] H01V *37/317*
U.S. Cl. 250—492.2 **14 Claims**



1. A lithographic apparatus for structuring a subject with a plurality of particle probes, said apparatus comprising a beam generator composed of a plurality of sources for particle beams arranged in a line, and a first telecentric unit for focussing the particle beams to form particle probes onto the subject.

4,996,442

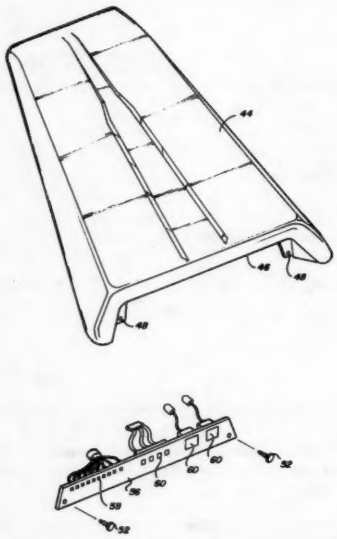
COMBINATION HOODSCOOP AND TACHOMETER

Mark Wayne, 29436 Briarbank Ct., Southfield, Mich. 48034

Continuation-in-part of Ser. No. 201,328, May 27, 1988, abandoned, which is a continuation-in-part of Ser. No. 4,616, Jan. 20, 1987, abandoned. This application Feb. 9, 1989, Ser. No. 308,810
Int. Cl.[5] B60K *11/00, 37/00*
U.S. Cl. 307—10.100 **23 Claims**

1. In combination, a motor vehicle having a hood and a driver locus;

a plastic hoodscoop affixed to said hood having a rear-facing portion visible from said locus; and



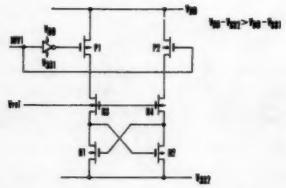
a removably insertable plate extending over substantially the entire rear-facing portion.

4,996,443

INTEGRATED CIRCUIT FOR LEVEL SHIFT

Tetsuya Tateno, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 1, 1989, Ser. No. 317,813
Claims priority, application Japan, Mar. 7, 1988, 63-051545
Int. Cl.[5] H03K *17/10, 17/16, 17/687, 3/356*
U.S. Cl. 307—264 **10 Claims**



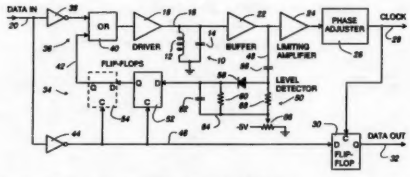
1. An integrated circuit for level shift, comprising a first series-connected circuit including a first MOS FET (P1) of one conductive type, a third MOS FET (N3) of another conductive type and a first MOS FET (N1) of the other conductive type which are connected in series in this order, and a second series-connected circuit including a second MOS FET (P2) of the one conductive type, a fourth MOS FET (N4) of the the other conductive type and a second MOS FET (N2) of the other conductive type which are connected in series in this order, said first series-connected circuit and said second series-connected circuit being connected in parallel to each other to constitute a parallel-connected unit, a gate of said first MOS FET of the one conductive type and a gate of said second MOS FET of the one conductive type being connected respectively to the output side and the input side of an inverter (INV1) connected to a low voltage electric power source, a gate of said third MOS FET of the other conductive type and a gate of said fourth MOS FET of the other conductive type both being connected to a reference voltage source (Vref), a gate of said first MOS FET of the other conductive type being connected to a common junction point of said fourth MOS FET of the other conductive type and said second MOS FET of the other conductive type, a gate of said second MOS FET of the other conductive type being connected to a common junction point of said third MOS FET of the other conductive type and said first MOS FET of the other conductive type, said parallel-connected unit being for connection to a high voltage electric power source (V_{DD}).

4,996,444

CLOCK RECOVERY CIRCUIT

Robert M. Thomas, Nepean, and Joseph P. R. M. Pigeon, Ottawa, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Sep. 21, 1989, Ser. No. 410,376
Int. Cl.[5] H03K *5/08;* **H04D** *9/00*
U.S. Cl. 307—269 **6 Claims**



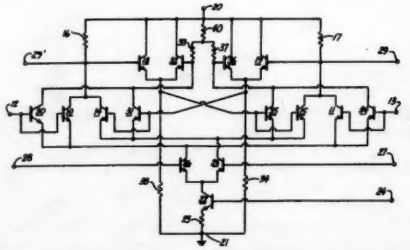
1. A clock recovery circuit comprising:
a resonant circuit for oscillation at a clock frequency;
output means, coupled to the resonant circuit for deriving a clock signal from the resonant circuit;
drive means coupled to the resonant circuit responsive to a data signal for driving the resonant circuit; and
inhibit means, coupled between the output means and the drive means, for inhibiting the drive to the resonant circuit in dependence upon an oscillation amplitude of the resonant circuit.

4,996,445

DISTURBANCE RESISTANT DATA STORAGE CIRCUIT

Stephen C. Y. Lin, Phoenix, Ariz., assignor to Honeywell Inc., Minneapolis, Ind.

Filed Jul. 13, 1989, Ser. No. 379,395
Int. Cl.[5] G11C *11/00;* **H03K** *3/29, 19/20*
U.S. Cl. 307—272.3 **11 Claims**



1. An improvement for a data storage circuit having first and second inputs, and first and second outputs, said data storage circuit also having first and second initial receipt control bipolar transistors, first and second initial complement control bipolar transistors, a receipt load means and a complement load means, said first initial receipt control bipolar transistor base

being electrically coupled to said first input, said first and second initial receipt control bipolar transistors each having an emitter thereof electrically coupled to a first current determination means, said receipt load means electrically connected between a first terminal means suited for electrical coupling to a first source of voltage and both collectors of said first and second initial receipt control bipolar transistors which together are electrically coupled to said second initial complement control bipolar transistor at its base, said first initial complement control bipolar transistor base being electrically coupled to said second input, said first and second initial complement control bipolar transistors each having an emitter thereof electrically coupled to said first current determination means, said complement load means electrically connected between said first terminal means and both collectors of said first and second initial complement control bipolar transistors which together are electrically coupled with said second initial receipt control bipolar transistor at its base, said improvement comprising:

a first receipt drive bipolar transistor having both its collector and its base electrically coupled to said first terminal means;

a first complement drive bipolar transistor having both its collector and its base electrically coupled to said first terminal means;

first and second supplementary receipt control bipolar transistors with said first supplementary receipt control bipolar transistor having its base electrically coupled to said first input and said second supplementary receipt control bipolar transistor having its base electrically coupled to said first complement drive transistor at its emitter, said first and second supplementary receipt control bipolar transistors each having a collector thereof electrically coupled to said first receipt drive bipolar transistor at its base, and said first and second supplementary receipt control bipolar transistors each having an emitter thereof electrically coupled to said first current determination means; and

first and second supplementary complement control bipolar transistors with said first supplementary complement control bipolar transistor having its base electrically coupled to said second input and said second supplementary complement control bipolar transistor having its base electrically coupled to said first complement drive transistor at its emitter, said first and second supplementary complement control bipolar transistors each having a collector thereof electrically coupled to said first complement drive bipolar transistor at its base, and said first and second supplementary complement control bipolar transistors each having an emitter thereof electrically coupled to said first current determination means.

4,996,446

SEMICONDUCTOR DEVICE HAVING A REVERSE BIAS VOLTAGE GENERATOR

Kazuhiro Nakada, Tokyo, Japan, assignor to NEC Corporation, Japan

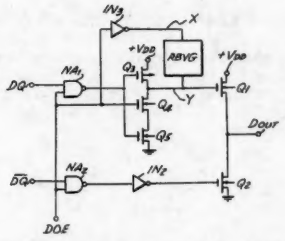
Filed Sep. 27, 1989, Ser. No. 413,336

Claims priority, application Japan, Sep. 27, 1988, 63-242724

Int. Cl.[5] H03K *3/01, 17/16;* **G11C** *11/00*

U.S. Cl. 307—296.2 **9 Claims**

1. An output circuit comprising means for receiving a first input data signal; means for receiving a second input data signal complementary to said first input data signal; means for receiving an output enable signal taking one of first and second logic levels; a first output field effect transistor having a gate and a drain-source current path connected between a power voltage terminal and an output terminal, said power voltage terminal receiving a power voltage of a first polarity; a second output field effect transistor having a gate and a drain-source current path coupled between said output terminal and a reference voltage terminal receiving a reference voltage; a first gate circuit receiving said first input data signal and said output enable signal and having a first control node coupled to a gate of said first transistor, said first control node assuming one of logic levels corresponding to said first input data signal when said output enable signal is at said first level and a high impedance state when said output enable signal is at said second level; a second gate circuit receiving said second input data signal and said output enable signal and having a second control node coupled to a gate of said second transistor, said second control node assuming one of the logic levels corresponding to said second input data signal when said output



enable signal is at said first level and an inactive level making said second transistor non-conductive when said output enable signal is at said second level; and a reverse bias voltage generating circuit having a control node receiving said output enable signal and coupled to the gate of said first transistor and a bias output node, said bias output node being set at a bias voltage when said output enable signal is at said second level and at a high impedance state when said output enable signal is at said first level, said bias voltage being of the opposite polarity with respect to that of said power voltage.

4,996,447

FIELD-EFFECT TRANSISTOR LOAD CIRCUIT

Satoru Tanoi, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

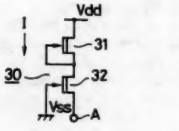
Continuation of Ser. No. 285,522, Dec. 16, 1988, abandoned.

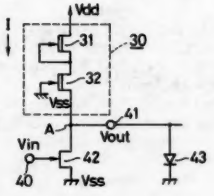
This application Aug. 13, 1990, Ser. No. 568,521

Claims priority, application Japan, Dec. 18, 1987, 62-320647

Int. Cl.[5] H03K *3/353, 19/017*

U.S. Cl. 307—304 **12 Claims**





1. A field-effect transistor load circuit for use in an electronic circuit having a supply voltage terminal, a ground terminal, and a drive node for connection to a driving circuit, said field-effect transistor load circuit comprising:

a first field-effect transistor of a normally-on type having gate and source electrodes coupled together; and

a second field-effect transistor of a normally-on type having a gate electrode connected to the ground terminal;

wherein said first field-effect transistor and said second field-effect transistor are connected in series between the supply voltage terminal and the drive node; and

wherein a transistor gain coefficient of said first field-effect transistor is less than a transistor gain coefficient of said second field-effect transistor.

4,996,448

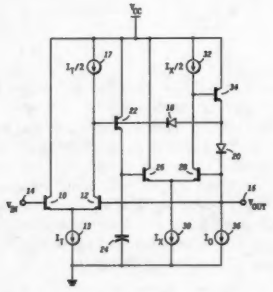
LOW POWER PEAK DETECTOR/BUFFER WITH FAST CHARGE-UP TIME

Behrooz L. Abdi, Chandler, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 27, 1989, Ser. No. 442,272

Int. Cl.[5] H03K *5/153*

U.S. Cl. 307—351 **8 Claims**



1. A circuit for providing an output signal at an output representing a most positive voltage level of an input signal applied at an input, comprising:

comparator means having a first input coupled to the input and a second input coupled tot eh output of the circuit for providing a current at an output thereof whenever the voltage of said first input exceeds a voltage appearing at said second input;

amplification means coupled to said output of said comparator means for amplifying said current of said comparator means;

capacitive means responsive to said amplification means for charging to the most positive voltage level appearing at the input of the circuit; and

buffer means coupled to said capacitive means for transforming a voltage developed across said capacitive means to the output of the circuit, said buffer means to a voltage substantially equal to a voltage appearing at the output of the circuit whenever the voltage level of the applied input signal is less than the voltage level of the output signal.

4,996,449

OUTPUT CIRCUIT HAVING HIGH SPEED OPERATION AND LOW POWER DISSIPATION

Masaji Ueno, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 17, 1989, Ser. No. 380,335

Claims priority, application Japan, Jul. 19, 1988, 63-179682

Int. Cl.[5] H03K *19/02*

U.S. Cl. 307—446 **3 Claims**

1. An output circuit comprising:

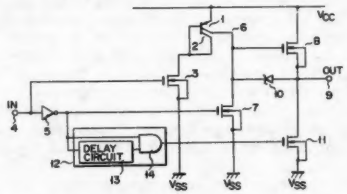
a first MOS transistor, a source-drain path of which is connected between a first potential and an output terminal;

a level shift bipolar transistor connected between said first potential and a gate of said first MOS transistor;

a second MOS transistor, a source-drain path of which is connected between a control terminal of said bipolar transistor and a second potential, and a gate of which receives a first control signal;

a constant voltage element connected between the gate of said first MOS transistor and said output terminal;

a third MOS transistor having an element size smaller than that of a fourth MOS transistor, a source-drain path of said third MOS transistor being connected between a node of said gate of said first MOS transistor, a first collector of



said bipolar transistor, and said constant voltage element, and said second potential, and a gate of said third MOS transistor receiving a second control signal which is an inversion of the first control signal; and

the fourth MOS transistor, a source-drain path of which is connected between said output terminal and said second potential, and a gate of which receives a third control signal obtained by delaying the second control signal by a predetermined period of time.

4,996,450

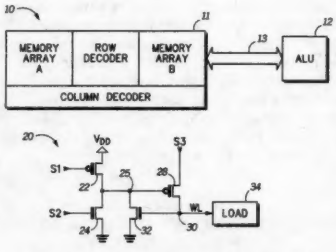
DATA PROCESSOR CIRCUIT AND METHOD FOR CONTROLLING VOLTAGE VARIATION OF A DYNAMIC NODE

Lloyd P. Matthews, Buda, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 28, 1990, Ser. No. 486,443

Int. Cl.[5] H03K *3/013, 3/353, 17/10, 19/046*

U.S. Cl. 307—449 **8 Claims**



1. In a data processing system comprising an arithmetic unit for performing predetermined arithmetic operations, a memory for communicating operands with the arithmetic unit via a coupled communications bus, a circuit within the memory for controlling the voltage variation of a dynamic node, comprising:

a first transistor having a first current electrode coupled to a first voltage terminal, a control electrode for receiving a first control signal, and a second current electrode coupled to the dynamic node;

a second transistor having a first current electrode coupled to the second current electrode of the first transistor at the dynamic node, a control electrode for receiving a second control signal, and a second current electrode coupled to a second voltage terminal;

a third transistor having a first current electrode for receiving a third control signal, a control electrode coupled to the second current electrode of the first transistor at the

dynamic node, and a second current electrode coupled to an output terminal for providing an output drive signal; and

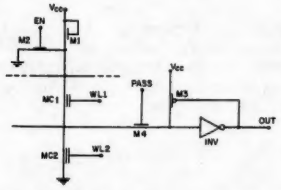
a fourth transistor having a first current electrode coupled to the control electrode of the third transistor at the dynamic node, a control electrode coupled to the output terminal, and a second current electrode coupled to the second voltage terminal.

4,996,451

PROGRAMMABLE STATIC SELECTION CIRCUIT FOR PROGRAMMABLE DEVICES

Antonio Chiriatti, Reggio Calabria, and Marco Masini, Milan, both of Italy, assignors to SGS-Thomson Microelectronics srl, Milan, Italy

Filed Sep. 25, 1989, Ser. No. 411,661
Claims priority, application Italy, Oct. 6, 1988, 22219 A/88
Int. Cl.[5] H03K *17/22*
U.S. Cl. 307—468 **8 Claims**



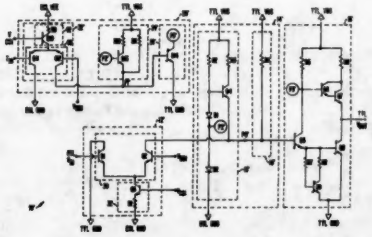
1. Programmable static selection circuit for programmable devices, characterized in that it comprises a pair of programmable cells connected in series, one of said cells conducting, the other being open, with one free terminal connected to the ground and the opposite free terminal coupled to a supply voltage; a threshold circuit having an input connected to the node between said two programmable cells, a switching threshold lower than the difference between said supply voltage and the threshold voltage of one of said programmable cells, and an output for assuming one of two logic levels depending on whether the voltage on the input is higher or lower than said threshold; and a first transistor connected between the ground and said opposite terminal of the pair of programmable cells, said transistor being normally off and having a gate which can be driven to make it conduct, wherein load means are connected between said opposite terminal of the pair of programmable cells and said supply voltage.

4,996,452

ECL/TTL TRISTATE BUFFER

Loren Yee, Milpitas, and Nguyen X. Sinh, San Jose, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Nov. 15, 1989, Ser. No. 436,846
Int. Cl.[5] H03K *19/02*
U.S. Cl. 307—475 **14 Claims**



14. A circuit for translating tristate signals, which have a high voltage state and a low voltage state, and ECL level input signals, which have a high voltage state and a low voltage state, to TTL level output signals, which have a high voltage state, a low voltage state, and a high impedance state, the circuit comprising:

(a) ECL input means, responsive to the ECL level input signals, for generating an intermediate voltage signal corresponding to the ECL level input signals;

(b) a level shifter, coupled to the ECL input means, for maintaining the intermediate voltage signal in a desired range of voltages;

(c) TTL output means, coupled to the level shifter, responsive to the intermediate voltage signal, for generating TTL level output signals corresponding to the intermediate voltage, thereby providing TTL level output signals corresponding to ECL level input signals; and

(d) a tristate controller, coupled to the level shifter and the TTL output means, responsive to the tristate signal, for causing the TTL output means to enter a high impedance state, the tristate controller including:

(i) a tristate signal input circuit, responsive to the tristate input signals, for generating an intermediate tristate voltage signal corresponding to the tristate input signals;

(ii) a tristate control circuit, coupled to the tristate signal input circuit, responsive to the intermediate tristate voltage signal, for causing the TTL output means to enter a high impedance state; and

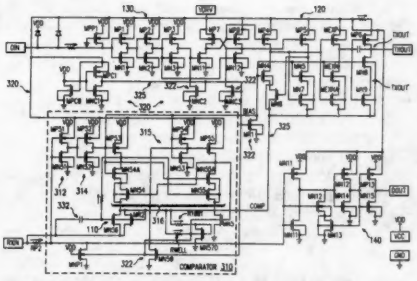
(iii) a tristate pull-up circuit coupled to the tristate control circuit, for preventing the intermediate tristate voltage signal from entering a constant low state.

4,996,453

POWER DOWN CIRCUIT FOR LOW-POWER CIRCUIT WITH DUAL SUPPLY VOLTAGES

Gary V. Zanders, Dallas, and Robert D. Lee, Denton, both of Tex., assignors to Dallas Semiconductor, Dallas, Tex.

Filed Jul. 28, 1989, Ser. No. 387,546
Int. Cl.[5] H03K *19/092*
U.S. Cl. 307—475 **21 Claims**



1. A low-power integrated circuit, comprising:

first, second, and third nodes for receiving first, second, and third power supply voltages, respectively, wherein said third node is connected to provide a common voltage, and wherein the difference between said first and third voltages is expected to be at least as large as the difference between said second and third voltages;

a first logic circuit coupled to said second and third nodes and to provide a digital output which

remains in a first state as long as a substantial difference exists both between said first and third voltages and also between said second and third voltages, but

assumes a second state if said second voltage approaches said third voltage while a substantial difference still exists between said first and third voltages;

additional logic elements; and

a plurality of node-clamping transistors,

connected between said first logic circuit and said additional logic elements and to receive said digital output of said first logic circuit,

and to drive a respective plurality of nodes of said additional logic elements to respectively known voltages if said digital output of said first logic circuit assumes said second state.

4,996,454

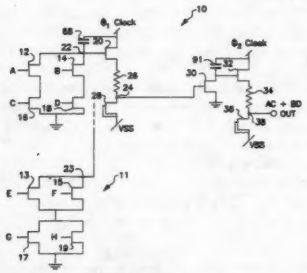
HOT CLOCK COMPLEX LOGIC

Andrezj Peczalski, Brooklyn Park; Julio C. Costa, and Jeffrey S. Conger, both of Minneapolis, Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 30, 1989, Ser. No. 374,196

Int. Cl.[5] H03K *19/017, 19/02*

U.S. Cl. 307—480 **12 Claims**



1. A very high frequency hot clock logic circuit that functions solely on power from clock signals and performs logic operations at rising edges of the clock signals, comprising:

first switching means, connectable to reference means, for receiving input signals for said logic circuit;

second switching means, connected to said first switching means and connectable to first clock means, for receiving signals from said first switching means;

first coupling means, connected to said second switching means and connectable to the first clock means, for coupling clock signals to said first switching means;

first variable attenuating means, connectable to second clock means, for receiving clock signals,

third switching means, connected to said second switching means and first variable attenuating means, and connectable to the reference means, for receiving signals from said first variable attenuating means; and

first output means, connected to said second and third switching means, for outputting signals from said second and third switching means.

4,996,455

INDUCTIVE ENERGY CONVERTER WITH SPACED WINDING CONTACTS

Markus Löffler, Unterluss, and Ulrich Braunsberger, Lengende, both of Fed. Rep. of Germany, assignors to TZN Forschungs- und Entwicklungszentrum Unterluss GmbH, Unterluss and Rheinmetall GmbH, Düsseldorf, both of, Fed. Rep. of Germany

Filed Feb. 16, 1990, Ser. No. 480,500

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1989, 3905059

Int. Cl.[5] F41E *1/00;* **G05B** *24/02;* **H02K** *3/04*

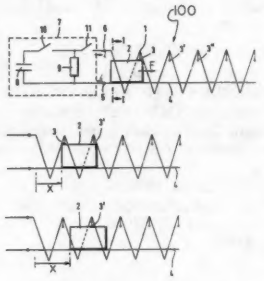
U.S. Cl. 310—12 **18 Claims**

1. An inductive energy converter, comprising:

a coil assembly having coil windings, at least some of said coil windings respectively having a plurality of spaced contact regions;

a contact bar disposed within said coil assembly and insulated from said coil windings; and

a conductive body which is in electrical contact with said contact bar and which is movably supported by said coil



assembly, wherein movement of said conductive body brings it into electrical contact with consecutive ones of said plurality of spaced contact regions to complete an electrical circuit between a respective one of said windings and said contact bar.

4,996,456

AXIAL RETAINERS FOR COATED ELECTROMAGNETIC ROTOR

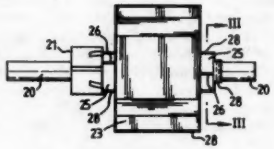
Georg Strobl, Repulse Bay, Hong Kong, assignor to Johnson Electric S.A., La Chaux de Fonds, Switzerland

Filed Dec. 1, 1989, Ser. No. 444,201

Claims priority, application United Kingdom, Dec. 2, 1988, 8828162

Int. Cl.[5] H02K *15/02;* **F16B** *2/00*

U.S. Cl. 310—261 **15 Claims**



1. A rotor for an electric motor, the rotor comprising a shaft of the motor and a laminated armature stack on the shaft and a collar mounted on the shaft, the collar abutting one end of the armature stack, wherein the collar is split radially on one side along its axial length and is formed from a cylinder having an internal diameter equal to or slightly less than the outer diameter of the shaft, whereby a space is formed between the shaft and collar, and a structural coating fills the space and glues the collar to the shaft.

4,996,457

ULTRA-HIGH SPEED PERMANENT MAGNET AXIAL GAP ALTERNATOR WITH MULTIPLE STATORS

Robert A. Hawsey, Oak Ridge, and J. Milton Bailey, Knoxville, both of Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 28, 1990, Ser. No. 500,353

Int. Cl.[5] H02K *1/28, 21/24*

U.S. Cl. 310—268 **19 Claims**

1. An ultra-high speed, permanent magnet, axial-gap alternator for supplying a load, which comprises:

a rotatable shaft having an axis;

means for rotating said shaft around said axis at a selected speed;

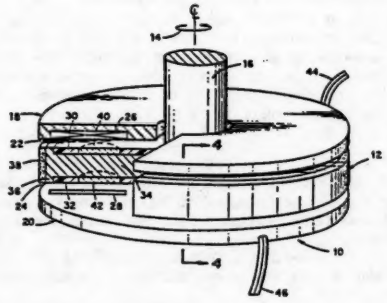
a disk-type rotor member fixedly attached to said shaft so as to rotate with said shaft, said rotor member having first and further parallel surfaces perpendicular to said axis, said rotor member fabricated from laminated disk-type layers having

a. a central disk-shaped layer of a magnetic material extending from proximate said shaft to a peripheral edge,

b. a first layer of a non-magnetic material joined to a first surface of said central layer, said first layer of non-magnetic material defining said first surface of said rotor member,

c. a second layer of non-magnetic material joined to a second surface of said central layer, said second layer of non-magnetic material defining said second surface of said rotor member,

d. a first set of an even number of magnets positioned within said first layer of non-magnetic material and arranged at a first common radius from said shaft, said magnets of said first set extending substantially from said first surface of said rotor member to said central layer of said rotor member, and



e. a second set of an even number of magnets positioned within said second layer of non-magnetic material and arranged at a second common radius from said shaft, said magnets of said second set extending substantially from said further surface of said rotor member to said central layer of said rotor member;

a first disk-type stator member positioned at close proximity to said first surface of said rotor member, said first stator member having a surface, facing said first surface of said rotor member, provided with equally-spaced radially extending slots, said slots containing winding members each electrically connected to a first output cable for said first stator member to connect said first stator member to a load 7; and

a second disk-type stator member positioned at close proximity to said further surface of said rotor member, said second stator member having a surface, facing said further surface of said rotor, provided with equally-spaced radially extending slots, said slots containing winding members each electrically connected to a second output cable for said second stator member to connect said second stator member to a load.

4,996,458

SHADOW MASK ASSEMBLY FOR COLOR CATHODE RAY TUBE

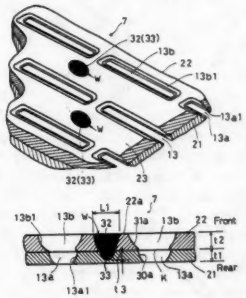
Atsushi Hattori, Nagaokakyo; Mabito Hanajima; Masaharu Moriyasu, both of Amagasaki; Toshikazu Iwamoto, and Kazuhiko Matsumoto, both of Nagaokakyo, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 14, 1989, Ser. No. 366,179

Claims priority, application Japan, Jun. 17, 1988, 63-150509; Aug. 6, 1988, 63-196890; Aug. 6, 1988, 63-196891; Sep. 21, 1988, 63-237107; Oct. 31, 1988, 63-276814; Dec. 23, 1988, 63-327111

Int. Cl.[5] H01J *29/07*

U.S. Cl. 313—402 **10 Claims**



1. A laminated shadow mask assembly for use in a color picture tube including an evacuated envelope having a longitudinal axis and also having a phosphor deposited screen lying generally perpendicular to the longitudinal axis, which assembly comprises:

a finely perforated, laminated shadow mask having a plurality of apertures defined therein in a predetermined pattern;

a support frame for the support of the laminated shadow mask; and

expansion compensating couplings disposed around the support frame for connecting the support frame in position within the evacuated envelope with the laminated shadow mask held generally parallel to the phosphor deposited screen, said expansion compensating couplings being operable to compensate for a thermal expansion of the laminated shadow mask assembly thereby to compensate for a color displacement;

said finely perforated, laminated shadow mask comprising at least two perforated metal sheets each having a perforated area having minute holes defined therein and also having a non-perforated area, said minute holes in both of the perforated metal sheets forming the apertures in the finely perforated, laminated shadow mask when combined together;

said perforated metal sheets being connected together by means of plurality of weld deposits formed at least within the perforated areas thereof to connect said perforated metal sheets firmly together.

4,996,459

CATHODE RAY TUBE FOR COLOR DISPLAY

Hiroo Kobayashi, Nagaokakyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaishi, Tokyo, Japan

Continuation of Ser. No. 803,507, Nov. 29, 1985, abandoned, Continuation of Ser. No. 543,620, Oct. 20, 1983, abandoned. This application Mar. 23, 1987, Ser. No. 29,341

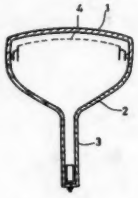
Claims priority, application Japan, Oct. 29, 1982, 57-191203

Int. Cl.[5] H01J *29/20, 29/86*

U.S. Cl. 313—467 **8 Claims**

1. A color cathode-ray tube for a color display, comprising

a face glass coated with a plurality of phosphors different in luminescent color, said face glass containing a colorant imparting a selective absorption characteristic for absorbing light in wavelength regions between the luminescent wavelength regions of said phosphors, and a colorant suppressing the light transmittance in the visible region, wherein the light transmittances in those of the luminescent wavelength regions of said phosphors which are shorter than the highest-visibility wavelength region are at least about 5% lower than the light transmittance in said highest-visibility wavelength region, while the light transmittances in the luminescent wavelength regions longer than said highest-visibility wavelength region are higher than the light transmittance in said highest-visibility wavelength region, said light transmittance in the highest-visibility wavelength region being suppressed to lie within the range of about 55–65%, said light transmittance in the luminescent wavelength region longer than said highest-visibility wavelength region being about 70%.



4,996,460

DC TYPE PLASMA DISPLAY PANEL

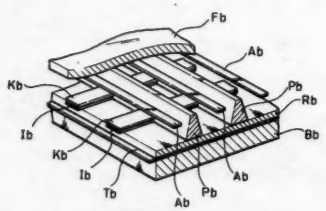
Dae-il Kim, and Woo-hyun Hwang, both of Suwon, Rep. of Korea, assignors to Samsung Electron Devices Ltd., Rep. of Korea

Filed Aug. 25, 1989, Ser. No. 398,439

Claims priority, application Rep. of Korea, Jul. 28, 1989, 89-10751

Int. Cl.[5] H01J *17/34*

U.S. Cl. 313—586 **2 Claims**



1. A plasma display panel comprising:

a front plate and a rear plate spaced to provide a discharge space,

a plurality of cathodes and anodes arranged between said plates in an X-Y matrix, said anodes being in proximity to said front plate and said cathodes being in proximity to said rear plate,

a trigger electrode which triggers main discharges between said cathodes and said anodes, said trigger electrode being between said cathodes and said rear plate,

a resistance layer on a surface of said trigger electrode and positioned such that a surface of said resistance layer is exposed to the discharge space, and

an insulation layer between said resistance layer and said cathodes.

4,996,461

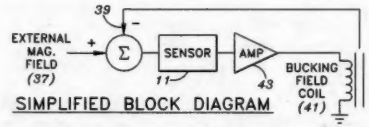
CLOSED LOOP BUCKING FIELD SYSTEM

Robert Bentley, Hacienda Heights, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Sep. 7, 1989, Ser. No. 404,147

Int. Cl.[5] H01J *29/06*

U.S. Cl. 315—8 **18 Claims**



1. A system for improving the operation of a cathode ray tube (CRT) by reducing interference caused by external electromagnetic fields comprising:

a CRT having a CRT magnetic shield housing

at least one electromagnetic field sensor disposed adjacent to an inner surface of the CRT magnetic shield, said sensor being formed to generate a reference electromagnetic field and to generate a sensor output signal in response to detection of both the reference field and an external field as sensed within the shield;

a bucking field coil drive circuit in electrical communication with said field sensor, the bucking field drive circuit being operative to generate a bucking field drive signal responsive to said field sensor output signal; and

a bucking field coil disposed circumferentially about said CRT and driven by said bucking field coil drive signal to generate a bucking electromagnetic field in opposition to the sensed external magnetic field, to oppose and reduce the degrading effects of the sensed external magnetic field on the operation of the CRT.

4,996,462

ELECTRONIC BALLAST FOR FLUOROSCENT LAMPS

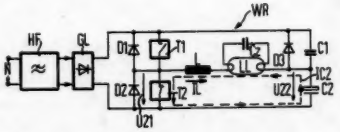
Peter Krummel, St. Georgen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 2, 1989, Ser. No. 360,782

Claims priority, application Fed. Rep. of Germany, Jul. 27, 1988, 3825513

Int. Cl.[5] H05B *37/02, 39/00;* **H02M** *7/5387*

U.S. Cl. 315—209 R **5 Claims**



1. An electronic ballast for fluorescent lamps, having an inverter that has its input side connected to an AC line via a series connection of a harmonic filter and a rectifier and that has its output side connected to at least one load circuit composed of a series circuit of an inductor and a parallel circuit composed of a capacitor and of a fluorescent lamp, whereby the inverter is fashioned as a switch bridge arrangement having two switch branches and two capacitor branches whose bridge terminals forming the output of the inverter are formed by the common junction of the two switch branches and by the common junction of the two capacitor branches, and whereby the two switch branches are composed of electronic switches having freewheeling diodes connected in parallel with the electronic switches, the switches being opened and closed in a push-pull fashion with a switching frequency that is high in comparison to the AC line frequency , comprising a storage capacitor required for the smoothing of the AC rectified line

voltage connected in one of the capacitor branches of the switch bridge arrangement; the storage capacitor having a value such that it is not fully charge-reversible at the line AC frequency, whereas another capacitor in the other capacitor branch has a freewheeling diode connected parallel thereto and is only of such a size that is fully charge-reversible at the switching frequency of the switches.

4,996,463

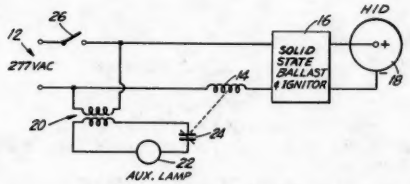
AUXILIARY LIGHTING SYSTEM FOR HIGH INTENSITY DISCHARGE LAMP

Victor Horowitz, 3359 Ocean Ave., Oceanside, N.Y. 11572

Filed Aug. 21, 1989, Ser. No. 396,552

Int. Cl.[5] H05B *41/14*

U.S. Cl. 315—250 **5 Claims**



1. In a high intensity discharge lamp control system having a solid state ballast and power input terminals, the auxiliary lighting arrangement for cold start and hot interrupt comprising:

an auxiliary lamp, and

auxiliary input terminals adapted to provide power to said auxiliary lamp,

a relay having a coil and a pair of normally closed contacts,

said relay contacts being in electrical series between said auxiliary lamp and said auxiliary input terminals to provide power to said lamp from said auxiliary input terminals,

said coil being electrical series between said power input terminals and the input terminals to said solid state ballast,

said relay contacts opening in response to the magnitude of input current to said ballast rising above a predetermined threshold to cut off power to said lamp from said auxiliary input terminals,

said relay contacts remaining closed when the magnitude of input current to said ballast is at a relatively low level.

4,996,464

IGNITOR DISABLER

Peter G. Dodd, Scarborough, and Franklyn Harrison, Oakville, both of Canada, assignors to Cooper Industries, Inc., Houston, Tex.

Filed Jun. 30, 1989, Ser. No. 374,647

Claims priority, application Canada, May 26, 1989, 600879

Int. Cl.[5] H05B *41/14*

U.S. Cl. 315—289 **11 Claims**

1. An ignitor disabler for use with a circuit for igniting a lamp, including an ignitor portion, wherein the lamp has a characteristic voltage which may vary during phases of lamp operation and wherein the lamp has a nominal operating voltage between 52 volts and 100 volts, comprising:

(a) a bi-directional triode thyristor or triac which is connected in series with the common line and the ignitor connection point in such a manner that when the triac is turned off it prevents the ignitor from functioning;

(b) a circuit connected between a power supply portion and the reset pin of an oscillator chip, the circuit including a zener diode biased such that its breakdown voltage exceeds the voltage at the input of the circuit under normal lamp operating conditions, the circuit being designed to generate an output voltage corresponding to a logic 0 upon sensing conduction by the zenner diode;

(c) trigger means comprising:

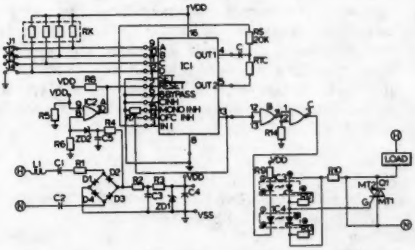
(i) an oscillator chip with pin connections and associated circuit components such that an input voltage corresponding to a logic 0 at the reset pin of the oscillator chip causes an output voltage corresponding to a logic 1 to appear at the output pin of the oscillator chip after a predetermined period of time;

(ii) a buffer stage with input connected to the output pin of the oscillator chip; and

(iii) an opto-isolator circuit with input connected to the output of the buffer stage in such a manner that a logic 1 voltage generated at the output of the buffer stage when fed to the emitter side of the opto-isolator results in the opto-isolator circuit being turned off thereby engaging the disabling means.

(d) a circuit with output connected to the reset pin of the oscillator chip, the circuit being designed to generate an output voltage corresponding to a logic 1 upon sensing lamp ignition being accomplished;

(e) a power supply portion comprising:



(i) a first stage series resonant circuit connected across the lamp terminals designed to attenuate the high frequency harmonics generated by the high voltage starting pulses, from the lamp voltage and to reduce the voltage;

(ii) a second stage full-wave rectifier to receive the output from the first stage designed to generate a substantially direct current type, the voltage equivalent of which is dependent upon the lamp operating voltage, this substantially direct voltage signal forming the input signal for both the threshold establishing circuit and a third stage of the power supply;

(iii) a filtering third stage to receive the output from the second stage and designed to generate a signal which more closely approximates a direct current type signal;

(iv) a voltage regulating fourth stage to receive the output signal from the third stage and to generate a signal which more closely approximates a direct voltage-type signal;

(v) a filtering fifth stage to receive the output signal from the fourth stage and to generate a final signal in which substantially all of the alternating type components have been attenuated.

4,996,465

VARIABLE COLOR LIGHTING DEVICE

Tadao Uetsuki, Osaka, Japan, assignor to Matsushita Electric Works, Ltd., Japan

Filed Jun. 22, 1989, Ser. No. 370,252

Claims priority, application Japan, Jun. 27, 1988, 63-158465; Nov. 16, 1988, 63-290781

Int. Cl.[5] H01J *17/36*

U.S. Cl. 315—358 **3 Claims**

1. A variable color lighting device comprising:

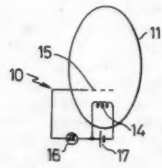
a light permeable tube, mercury vapor and neon gases having different ionization potentials V_1 and V_2, respectively, sealed in said tube,

a thermionic emission type cathode disposed in said tube,

a heat source connected to said cathode for heating said cathode and causing electrons to be thermionically emitted from said cathode,

an electron permeating type anode also disposed in said tube spaced from said cathode by several mm to several cm,

a variable voltage power source means connected to said cathode and anode for applying voltages to said cathode and anode to impart varying accelerating energy to the



electrons and to ionize the respective gases in said tube to emit light of different color, said gases having a light-emission ratio which varies in accordance with the voltages applied to said cathode and anode to generate variable color light, p1 said variable voltage power source means being adjusted to apply a relatively higher voltage V_H and a relatively lower voltage V_L to said cathode and anode, the applied voltages V_H and V_L being in such relationship to the ionization potentials V_1 and V_2 of said gases that $V_1<V_L<V_2$ and $V_H>V_2$.

4,996,466

CIRCUIT FOR CONTROLLING A TAPE TENSION DURING SEARCH MODE

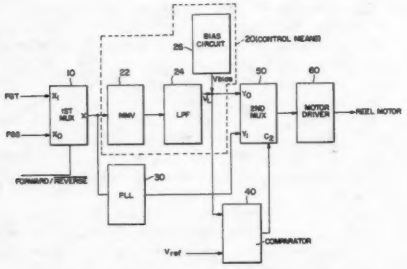
Hyun-Joon Su, Seoul, Rep. of Korea, assignor to SamSung Electronics, Ltd., Suweon, Rep. of Korea

Filed Dec. 30, 1988, Ser. No. 292,105

Claims priority, application Rep. of Korea, May 18, 1988, 1988-7366

Int. Cl.[5] B65H *59/38*

U.S. Cl. 318—6 **23 Claims**



1. A circuit for controlling a tape tension upon a search mode in a reel motor driving circuit which drives a reel motor in the search mode by receiving frequency generating signals according to a rotation of a take-up and a supply reel, said circuit comprising:

first multiplexor means for selectively outputting a frequency generating signal depending on the rotation of the take-up reel or the supply reel selected respectively by a forward signal or a reverse signal;

control means for synthesizing a unidirectional voltage from the frequency generating signal output by said first multiplexor means and a minimum bias voltage capable of driving said reel motor;

phase locked means for receiving and phase-locking the frequency generating signal from said first multiplexor means and generating a phase-locked output;

comparator means for comparing the synthesized unidirectional voltage generated by said control means with a predetermined reference voltage, and outputting a first control signal or a second control signal;

second multiplexor means for selecting the synthesized unidirectional voltage from said control means when the first control signal is output from said comparator means and for selecting the phase-locked output from said phase locked means when the second control signal is output from said comparator means; and

motor driver means for receiving the output from said second multiplexor means and for driving the reel motor.

4,996,467

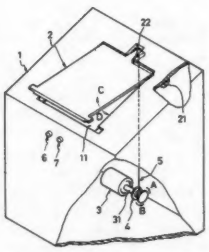
GARBAGE CONTAINER

Jong-Yih Day, 5F No. 5-1, Alley 62, Lane 166, Shih-Pai Rd., Taipei, Taiwan

Filed Dec. 22, 1989, Ser. No. 454,993

Int. Cl.[5] E05F *15/20*

U.S. Cl. 318—480 **2 Claims**



1. A garbage container comprising:

a container body having an opening;

a cover for covering said opening; a motor mounted on said container body, having an output shaft capable of rotating in both clockwise and counterclockwise directions;

a rotor fixed on said output shaft of said motor;

a control rope with one end fixed on said cover and the other end fixed and partially wound on said rotor;

an infrared ray transmitter for transmitting infrared ray to detect the presence of a user;

An infrared ray receiver for receiving the infrared ray reflected back and sending out a first signal and a second signal;

a first actuating circuit for receiving said first signal from said infrared ray receiver to actuate said motor to rotate said output shaft in a clockwise direction;

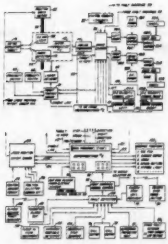
a second actuating circuit for receiving said second signal from said infrared ray receiver to actuate said motor to rotate said output shaft in a counterclockwise direction; a delay circuit connecting said infrared ray receiver and said second actuating circuit for delaying said second signal received from said infrared ray receiver so that when a user is present in front of said garbage container, said cover will open automatically and will close automatically after a predetermined time of the departure of the user.

4,996,468

AUTOMATED GUIDED VEHICLE

Bruce F. Field, Minneapolis, and Joseph G. Kasper, Golden Valley, both of Minn., assignors to Tennant Company, Minneapolis, Minn.

Division of Ser. No. 222,894, Jun. 22, 1988, Pat. No. 4,846,297, which is a division of Ser. No. 101,508, Sep. 28, 1987, Pat. No. 4,790,402. This application Mar. 13, 1989, Ser. No. 322,103
Int. Cl.[5] G05D *1/03*
U.S. Cl. 318—587 9 Claims



1. A guided vehicle comprising drive means, steering means, a plurality of targets mounted along a desired path of the vehicle, manual control means connected to the vehicle and manipulable by an operator for controlling the drive and steering means, fault detection means for sensing conditions which preclude continued safe operation of the vehicle and controlling the drive and steering means in response thereto, computer control means for controlling the drive and steering means so as to cause the vehicle to traverse a programmed path and sighting means on the vehicle for successively sensing one of the targets and controlling the drive and steering means to maintain a specified relationship between the vehicle and the targets, the manual control means, fault detection means, computer control means and sighting means defining command types which are connected in a command hierarchy, in that order, wherein each command type can automatically take control away from any type following it.

6. A method of automatically guiding a vehicle to cause it to traverse a predetermined path, comprising the steps of placing a plurality of targets along the path, transmitting a light beam from the vehicle, detecting at the vehicle transmitted light reflected from one of said targets and defining a target-in-view signal when such light is detected, controlling the angle of elevation of the transmitted light beam, with reference to a horizontal plane, so as to maintain the target-in-view signal substantially continuously as the vehicle moves, detecting the direction from which reflected light is received, defining a reference line, comparing the detected light direction to the reference line to determine an heading error angle, steering the vehicle, when a target-in-view signal is present, so as to reduce the heading error angle to zero, and steering the vehicle in a straight line when no target-in-view signal is present, regardless of the heading error angle.

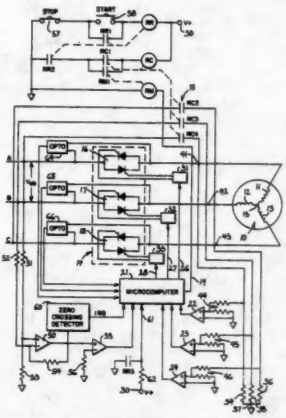
8. An automated guided vehicle having a frame, first and second drive wheels mounted on the frame, first and second motors for driving the wheels, a guidance system for guiding the vehicle along a predetermined path, the guidance system comprising a plurality of targets mounted along the path, sighting means on the vehicle for successively sensing at least one of the targets and its direction relative to the sighting means, and control means for steering the vehicle in response to the sighting means such that the vehicle maintains a specified relationship to the targets, the control means including first and second ramp circuits associated with the first and second motors, respectively, each ramp circuit having a plurality of selectable ramps for altering the motor speed at different rates depending on vehicle speed to provide two-wheel differential steering which makes prompt steering corrections without hunting.

4,996,469

ELECTRIC MOTOR CONTROLLER WITH BYPASS CONTACTOR

Robert J. DeLange, St. Francis, and John C. Merrison, Wauwatosa, both of Wis., assignors to Allen-Bradley Company, Inc., Milwaukee, Wis.

Filed Mar. 16, 1990, Ser. No. 495,018
Int. Cl.[5] H02P *3/18;* H02D *5/40*
U.S. Cl. 318—757 11 Claims



10. A method for controlling the speed of an electric motor which is selectively coupled to a three-phase source of alternating electricity by a contactor and three thyristor switch means, said method comprising:

activating the contactor to couple the motor to the source;

deactivating the contactor in response to a command to stop the motor;

thereafter triggering the thyristor switch means;

detecting the first one of the triggered thyristor switch means to become non-conducting;

retriggering the first one of the thyristor switch means; and

thereafter, sequentially triggering each of the thyristor switch means in a pattern which reduces the speed of the motor.

4,996,470

ELECTRIC MOTOR SPEED CONTROL APPARATUS AND METHOD

Timothy M. Rowan, and John C. Merrison, both of Wauwatosa, Wis., assignors to Allen-Bradley Company, Inc., Milwaukee, Wis.

Filed Jul. 14, 1989, Ser. No. 380,050
Int. Cl.[5] H02P *5/40*
U.S. Cl. 318—772 19 Claims

1. An apparatus for controlling the speed of an electric motor which is supplied by a three-phase source of alternating electricity, the voltage of which has a frequency f, said apparatus comprising:

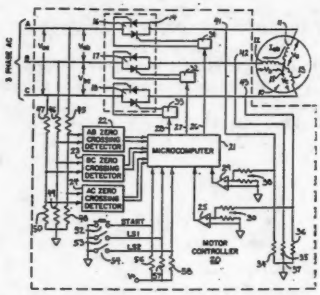
three bidirectional switch means, each coupling one of the phases of the source to a winding of the electric motor;

a brake means for reducing the speed of the motor to a predetermined level;

first means for detecting when the speed of the motor is below the predetermined level; and

first means for activating said switch means to apply electricity from the source to the motor in response to the

speed of the motor being below the predetermined level, the activation producing a periodic pattern of current pulses which produce an effective alternating current



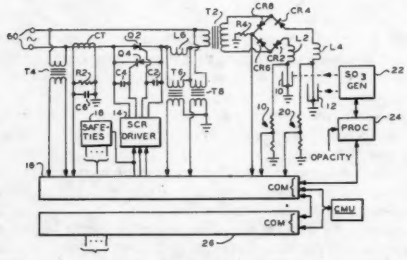
through the motor at a fundamental frequency component of the source voltage frequency, which is equal to $f/(6n+1)$ where n is a positive integer.

4,996,471

CONTROLLER FOR AN ELECTROSTATIC PRECIPITATOR

Frank Gallo, 188 Crescent Rd., Wanaque, N.J. 07465

Filed Feb. 28, 1990, Ser. No. 486,107
Int. Cl.[5] G05F *1/455;* B03C *3/68*
U.S. Cl. 323—241 **59 Claims**



1. A controller for controlling a precipitator, comprising:

a power modulator having a control terminal and being coupled to said precipitator, said power modulator being adapted to be powered by an alternating current, said power modulator being operable to regulate the drive to said precipitator in response to a control signal on said control terminal;

measurement means coupled to said precipitator for providing a plurality of measurement signals corresponding to a plurality of operating parameters of said precipitator; and

processing means having a program and being coupled to said measurement means and said power modulator for producing said control signal and for regulating said power modulator in response to said measurement signals, said processing means including:

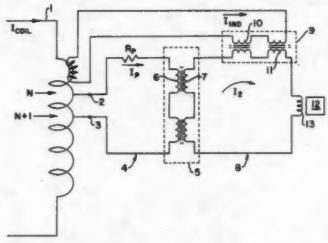
spark concurrence means responsive to at least one of said measurement signals for spark synchronously storing a sparktime signal having a magnitude corresponding to a given one of said operating parameters, said sparktime signal being distinctly stored and designated as a signal occurring during a spark, said processing means being operable to vary said control signal in response to said sparktime signal.

4,996,472

PASSIVE SUPERCONDUCTING QUENCH DETECTION SENSOR

George T. Mallick, Jr., Monroeville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 31, 1989, Ser. No. 401,589
Int. Cl.[5] G01N *27/00*
U.S. Cl. 324—71.6 **23 Claims**



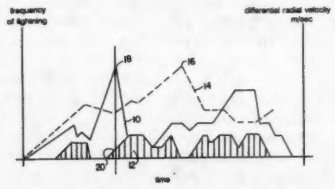
1. A passive superconducting sensor for detecting a quench in a superconducting coil having a plurality of voltage taps comprising: a first circuit having electrically connected in series two voltage taps of the superconducting coil, a series resistive element R_p, and a primary of a first transformer; a second circuit of superconducting elements having connected in series a secondary of the first transformer and a readout coil such that the second circuit is magnetically coupled to the first circuit by the first transformer, a readout device magnetically coupled to the readout coil for measuring a change in a current flow therein; and a second transformer having a superconducting secondary in series with the second circuit and being magnetically coupled to a primary winding in a loop circuit which detects flux changes in the superconducting coil.

4,996,473

MICROBURST/WINDSHEAR WARNING SYSTEM

Ralph J. Markson, Weston, Mass., and Bruce E. Anderson, Londonberry, N.H., assignors to Airborne Research Associates, Inc., Weston, Mass.

Continuation-in-part of Ser. No. 244,092, Sep. 14, 1988, abandoned, and a continuation-in-part of Ser. No. 116,482, Nov. 2, 1987, Pat. No. 4,901,564, said Ser. No. 244,092, is a continuation of Ser. No. 897,214, Aug. 18, 1986, Pat. No. 4,801,942. This application May 17, 1989, Ser. No. 353,390
Int. Cl.[5] G01W *1/00, 31/02*
U.S. Cl. 324—72 **18 Claims**



1. A system for predicting the occurrence of microburst-/windshear comprising:

a. one or more sensors responsive to signals from a thunderstorm to generate sensor signals;

b. one or more data processors in communication with said sensors for processing the sensor signals to produce data;

c. a warning device responsive to the data produced by one or more of said data processors for warning a user that a microburst/windshear will occur within a defined number of minutes at a location defined by the data, when the data

indicate that the lightning rate exceeds a first threshold value, the time rate of lightning increase exceeds a second theshold value and there is a peak in the lightning rate.

4,996,474

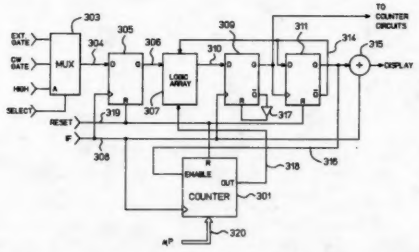
DIGITAL GATE GENERATION FOR A SIGNAL MEASUREMENT INSTRUMENT

Atul Tambe, San Jose; David Chu, Woodside, and Lee D. Cosart, III, Palo Alto, all of Calif., assignors to Hewlett-Packard Company, Pal Alto, Calif.

Filed Jul. 31, 1989, Ser. No. 388,214

Int. Cl.[5] G01R *23/02*

U.S. Cl. 324—78 D **10 Claims**



1. A circuit for providing a series of measurement gates relative to a repetitive input signal being measured, for performing a series of measurements to profile the frequency of the input signal, comprising:

logic means for providing an arming signal for arming the circuit to make a measurement;

means for generating a gate start signal in response the arming signal and to a signal indicative of the input signal being measured, the gate start signal synchronized to a selected event of the indicative signal;

means for generating a gate close signal in response to a signal indicative of the input signal being measured, a programmable integral number of indicative signal events after the gate start signal; and

means for sequentially incrementing the integral number after a measurement and signaling the arming means to provide an arming signal for performing another measurement.

4,996,475

ELECTRO-OPTIC VOLTAGE DETECTOR HAVING A TRANSPARENT ELECTRODE

Hironori Takahashi; Shinichiro Aoshima, and Yutaka Tsuchiya, all of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

Filed May 31, 1988, Ser. No. 200,575

Claims priority, application Japan, May 31, 1987, 62-137055; Jun. 5, 1987, 62-142062

Int. Cl.[5] G01R *31/00*

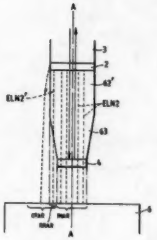
U.S. Cl. 324—96 **8 Claims**

1. A voltage detector for detecting a voltage developing in a selected area of an object to be measured, comprising:

a light source for emitting a light beam;

a voltage sensing part including an electro-optic material whose refractive index changes according to said voltage developing in said selected area of said object, a reflection means disposed on a first side surface of said electro-optic material for reflecting an input light beam, said reflection means being a mirror made of a multi-layered dialectric film, and a transparent electrode disposed on a second side surface of said electro-optic material opposite to said first side surface;

splitting and extracting means for extracting a light beam with a first predetermined polarized component from a light beam introduced from said light source, said light beam being launched into said electro-optic material as said input light, and for extracting an output light beam with a second predetermined polarized component from an output light beam emerging from said electro-optic material after reflecting from said reflection means; and



detection means for determining said voltage developing in said selected area of said object on the basis of intensity of said output light beam with said second predetermined polarized component.

4,996,476

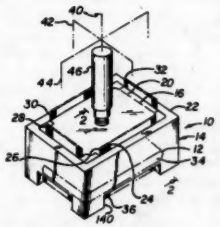
TEST CLIP FOR SURFACE MOUNT DEVICE

Marik Balyasny, Burbank, and Kenneth B. Baldwin, Alta Loma, both of Calif., assignors to ITT Corporation, New York, N.Y.

Filed Nov. 6, 1989, Ser. No. 432,093

Int. Cl.[5] G01R *31/02*; H01R *13/629, 23/72*

U.S. Cl. 324—158 F **8 Claims**



1. A test clip which can test an integrated circuit device having a body with an upper portion of predetermined size, a bottom that can rest substantially on face of a circuit board, and a plurality of leads extending outwardly largely away from said body from each of a plurality of said body sides, and that each have an outer lead part extending primarily vertically downwardly toward the circuit board over which said body lies, with said downwardly-extending lead parts having outer surfaces, comprising:

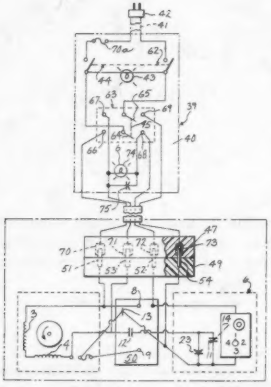
a clip housing with recess walls forming a recess that closely receives the upper portion of said circuit device body to locate said housing both horizontally and vertically with respect to said device body, said housing having contact-locating outer surfaces that lie slightly inward of said outer surfaces of said leads; a plurality of contacts mounted on said clip housing and having lower portions that each includes a first contact part that is biased inwardly against one of said contact-locating outer surfaces and a second contact part that extends below the corresponding contact-locating outer surface and that is positioned to be outwardly deflected by a corresponding outer lead surface as the clip housing receives the upper portion of said device housing, with the inner side of the bottom of each contact second part being tapered so it is outwardly deflected by a corresponding outer lead part.

4,996,477

APPARATUS AND METHOD FOR TESTING ELECTRICALLY CONTROLLED MOTOR

Randall W. Keeler, and James L. King, both of Troy, Ohio, assignors to A.O. Smith Corporation, Milwaukee, Wis.

Filed Oct. 26, 1989, Ser. No. 427,795
Int. Cl.[5] G01R *15/00, 15/12*
U.S. Cl. 324—158 MG **26 Claims**



20. A motor fault unit for testing a motor having a controller selectively connecting said motor winding to an incoming power supply, said controller having an electrical operator for a controller connecting means between said motor winding and said power supply, comprising a separate power supply unit having a first line and a second line, a power switch unit having a first switch in said first line and a second switch in said second line, a power switch indicator energized with said switch closed, a control state indicator connected to said first line downstream of said power switch, a test connector including a first power connector and a second power connector and a control test connector connected to said control state indicator, and said test connector having first connection means connecting said first and second lines directly to said motor winding for operating said motor from said separate power supply unit, and said test connector having a second connection means connecting said first and second lines directly to said controller for energizing said operator and connecting said control state indicator in circuit with the first connecting means across said first and second lines for monitoring the state of said controller.

4,996,478

APPARATUS FOR CONNECTING AN IC DEVICE TO A TEST SYSTEM

Keith A. Pope, Milwaukie, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Jan. 5, 1990, Ser. No. 461,160
Int. Cl.[5] G01R *1/06;* **H01P** *1/04;* **H01R** *17/04*
U.S. Cl. 324—158 P **22 Claims**

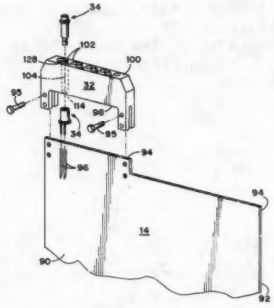
1. A coaxial probe mounting system comprising:

a circuit board having conductive runs thereon;

a frame member disposed adjacent to the circuit board and a coaxial probe assembly including:

a connector disposed within one end of the frame aperture and having a central conductor coaxially disposed with and electrically insulated from a cylindrical outer conductor by an insulating material, the cylindrical outer conductor and the central conductor at one end of the connector electrically connected to individual conductive runs on the circuit board and the other end having a portion of the insulating material removed forming a sleeve into which the central conductor extends, the cylindrical outer conductor having a rib formed therein extending into the sleeve; and

a removable coaxial probe disposed within the other end of the frame aperture and having a central conductor coaxially disposed with and electrically insulated from a cylindrical outer conductor by an insulating material, the outer conductor and the central conductor at one end of the



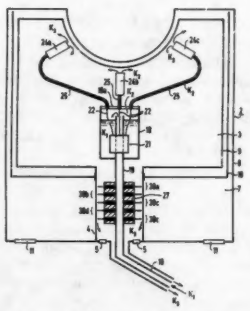
coaxial probe forming a coaxial probing tip and the other end having a notch formed in the cylindrical outer conductor for engaging the rib of the cylindrical outer conductor of the connector for securing the coaxial probe in the connector, the cylindrical outer conductor and the central conductor of the coaxial probe electrically contacting the respective outer conductor and central conductor of the connector.

4,996,479

MAGNETOMETER DEVICE WITH A DEWAR VESSEL FOR MEASURING WEAK MAGNETIC FIELDS

Eckhardt Hoenig, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Sep. 15, 1989, Ser. No. 408,108
Claims priority, application Fed. Rep. of Germany, Sep. 16, 1988, 3831545
Int. Cl.[5] G01R *33/035;* **A61B** *5/05;* **F17C** *13/02*
U.S. Cl. 324—248 **19 Claims**



1. A magnetometer device for measuring weak magnetic fields, of at least one field source comprising:

a Dewar vessel arranged below or laterally to the at least one field source and having an interior region and a neck, said interior region being accessed via said neck;

an insertion vessel disposed in the interior region of the Dewar vessel in which liquid refrigerant can be retained;

a plurality of superconducting gradiometers and associated

SQUIDs arranged in the interior region of the Dewar vessel, the SQUIDs being positioned in or at the insertion vessel;

a pipeline terminating in said insertion vessel and extending through the neck feeding liquid refrigerant through the neck from outside the Dewar vessel;

at least one hose line extending from the insertion vessel to the superconducting gradiometers feeding gaseous refrigerant to said gradiometers; and

a throttling device positioned in the neck for inhibiting warmer gaseous refrigerant from flowing back into the interior region, said pipeline extending through said throttling device.

4,996,480

IMAGE RECONSTRUCTING DEVICE FOR USE IN MAGNETIC RESONANCE IMAGING APPARATUS

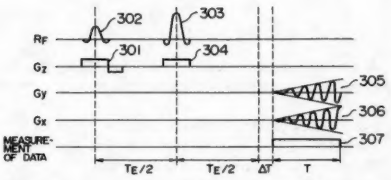
Akira Maeda, Gardena, Calif.; Koichi Sano, Sagamihara, Japan; Tetsuo Yokoyama, Tokyo, Japan, and Hideaki Koizumi, Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 262,282, Oct. 25, 1988, Pat. No. 4,901,021. This application Oct. 6, 1989, Ser. No. 418,224

Claims priority, application Japan, Nov. 6, 1987, 62-279217; Oct. 7, 1988, 63-251762

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—309 **8 Claims**



1. An image reconstructing device included in a magnetic resonance imaging apparatus, the device comprising:

a plurality of magnetic field generating means for generating a static magnetic field, gradient magnetic fields and a high-frequency magnetic field, the static, gradient and high-frequency magnetic fields being applied to an object to be inspected;

means for controlling the output of each of the magnetic field generating means in accordance with a predetermined procedure;

means for measuring a resonance signal at a predetermined time while applying a gradient magnetic field whose strength varies with time, to the to-be-inspected object;

means for constructing a plurality of tomograms by carrying out image reconstruction processing peculiar to each of a plurality of chemical shift components, for the measured resonance signal; and

means for estimating tomograms corresponding to the chemical shift components from the constructed tomograms.

4,996,481

MAGNETIC RESONANCE RF PROBE WITH ELECTROMAGNETICALLY ISOLATED TRANSMITTER AND RECEIVER COILS

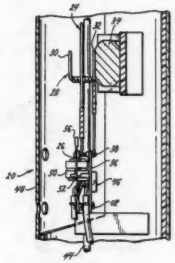
Joseph J. H. Ackerman, and Wei Chen, both of St. Louis, Mo., assignors to Washington University, St. Louis, Mo.

Filed Aug. 7, 1989, Ser. No. 390,176

Int. Cl.[5] G01R *33/30*

U.S. Cl. 324—318 **32 Claims**

1. A probe for transmitting RF energy in an externally generated magnetic field and sensing a magnetic field induced in a sample by said transmitted RF energy, said probe comprising a transmitter coil and a receive coil mounted non-orthogonally thereto, each of said coils having a near field radiation pattern of a well defined RF magnetic field, and said coils having a specific geometric orientation such that no significant coupling



occurs therebetween as the coils radiate in each other's field and in the presence of said sample.

4,996,482

CAPACITOR STICK FOR NMR PROBE

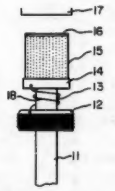
Teruaki Fujito, Tokyo, Japan, assignor to JEOL Ltd., Tokyo, Japan

Filed Sep. 20, 1989, Ser. No. 410,092

Claims priority, application Japan, Sep. 22, 1988, 63-124247[U]

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—318 **2 Claims**



1. In a sample coil arrangement for a nuclear magnetic resonance device wi&.h a capacitor stick arranged adjacent the sample and constituting part of the tuning circuit for the observation frequency, the improvement comprising:

(a) said capacitor stick having a chip capacitor spaced from a base electrode by an insulating means, and

(b) a compensating coil connecting the base electrode and the chip capacitor, said chip capacitor and compensating coil forming a series resonant circuit such that the resonant frequency corresponds to an NMR decoupling high frequency.

4,996,483

SPINNING ANGLE OPTICAL CALIBRATION APPARATUS

Stephen K. Beer, and Harold R. Pratt, II, both of Morgantown, W. Va., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 12, 1989, Ser. No. 406,004

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—321 **16 Claims**

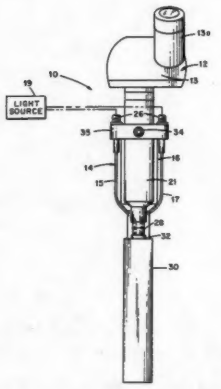
1. An apparatus for enabling reproducing of spinning magic angles in nuclear magnetic resonance spectroscopy applications, said apparatus comprising:

(a) a spinning angle cross-polarization probe including a sample holder means for holding spinning test samples, said holder means including a reference mark thereon;

(b) positioning means connected to said sample holder means

for enabling the angular position of the sample holder means to be varied; and

(c) viewing means, including at lest one reference, for permitting viewing of the reference mark of the sample



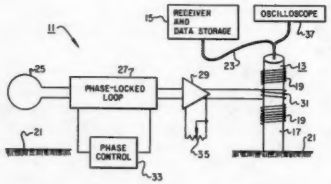
holder means relative to said at least one reference for the position of the sample holder means corresponding to the magic angle of the sample so that the sample holder means can later be returned to said position corresponding to the magic angle of the sample.

4,996,484

METHOD AND APPARATUS FOR CANCELLING POWERLINE NOISE IN GEOPHYSICAL ELECTROMAGNETIC EXPLORATION

Brian R. Spies, McKinney, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 29, 1988, Ser. No. 291,687
Int. Cl.[5] H01Q *23/00*; G01V *3/08*
U.S. Cl. 324—334 **22 Claims**



1. An apparatus for cancelling a narrow band noise of known frequency in geophysical electromagnetic receiving equipment having a sensing antenna for receiving electromagnetic signals including said narrow band noise, comprising:

(a) a cancelling antenna located in proximity to said sensing antenna such that said cancelling antenna can create an electromagnetic field that is of equal amplitude to said narrow band noise as detected by said sensing antenna;

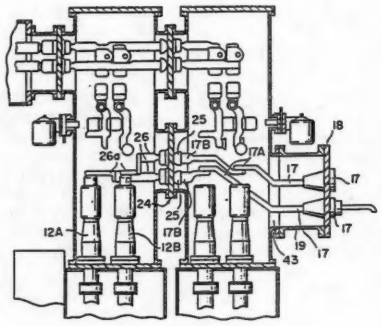
(b) alternating current means connected to said cancelling antenna for generating an alternating current in said cancelling antenna, said generated alternating current being of the same frequency as said narrow band noise, said generated alternating current in said cancelling antenna creating an electromagnetic field that is 180 degrees out of phase and of equal amplitude to said narrow band noise as detected by said sensing antenna.

4,996,485

GAS INSULATED SWITCH DEVICE

Kosaku Itai, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Dec. 12, 1989, Ser. No. 448,859
Claims priority, application Japan, Dec. 14, 1988, 63-316926
Int. Cl.[5] G01R *31/02*
U.S. Cl. 324—415 **4 Claims**



1. A gas insulated switch device for electrically disconnectably connecting systems of line cables to a main line, comprising:

a first hollow cylindrical closed container having a window formed on a side wall thereof, the first container being filled with an electrically insulating gas;

a second hollow cylindrical closed container disposed adjacent and axially parallel to the first container and having a window formed on a portion of a side wall thereof opposing said window of the first container, said window of the second container being coupled and sealed to said window of the first container, the second container being filled with an electrically insulating gas, wherein the second container has a second window formed on another portion of the side wall thereof, said second window being closed by a detachable closure plate under a service condition and adapted to be coupled to a test tank including at least one test conductor;

a first system of line cables including at least one line cable having an end portion extending into said first container;

a second system of line cables including at least one line cable having an end portion extending into said second container;

disconnector means for electrically disconnectably connecting the line cables of said first and second systems of line cables to the main line;

connection conductor means for electrically connecting the line cables of said first and second systems of line cables; and

at least one branch conductor disposed within the first container and having one end projecting from the first into the second container via said windows of the first and second containers coupled to each other, the other end of the branch conductor being capable of being electrically coupled to the line cable of the first system of line cables, wherein said one end of the branch conductor projecting into the second container is adapted to be electrically coupled to the test conductor of the test tank when the test tank is coupled to the second window of the second container.

4,996,486

METHOD AND APPARATUS FOR INSPECTING LAMINATED IRON CORE STACKS FOR INTERLAMINATION SHORTS

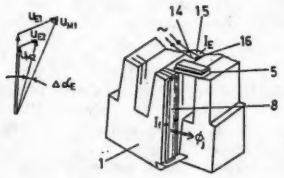
Zlatimir Posedel, Neuenhof, Switzerland, assignor to Asea Brown Boveri Ltd., Baden, Switzerland

Filed May 30, 1989, Ser. No. 358,638

Claims priority, application Switzerland, May 30, 1988, 2043/88

Int. Cl.[5] G01R *31/06*

U.S. Cl. 324—545 **7 Claims**



1. A method of inspecting a laminated core stack of an electric machine for interlamination shorts, in which method the core stack is magnetized by means of an auxiliary winding and the laminated surface is scanned by means of a measuring coil arrangement with a downstream measuring instrument, which method comprises determining, by means of at least two electrically separated, radially spaced, but mechanically interlinked measuring coils of said measuring coil arrangement, the radial distribution of the magnetic field of the current (I_F) due to the interlamination short from at least on of the phase difference and the change in amplitude of the voltages (U_{M1}, U_{M2}) induced in the at least two measuring coils.

4,996,487

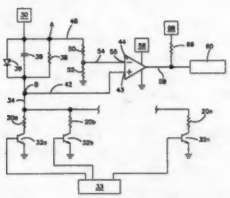
APPARATUS FOR DETECTING FAILURE OF THERMAL HEATERS IN INK JET PRINTERS

Ray A. McSparran, Charlotte; William S. Moore, Mooresville, and James R. Wooden, Charlotte, all of N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 24, 1989, Ser. No. 342,058

Int. Cl.[5] G01R *31/02*

U.S. Cl. 324—549 **15 Claims**



1. Apparatus for detecting failure of a thermal jet printing device wherein said printing device includes a plurality of electrically actuated printing jets, each of said printing jets including electrical resistance heating elements to generate a bubble,

and wherein there is provided electrical means including power supply means to supply current to said resistance heating elements,

and control means to selectively connect said resistance heating elements to the power supply means in preselected arrays;

the improvement which comprises;

signal generating and detecting means nonlinearly coupled to said resistance heating elements in continuous active circuit relationship therewith, said generating and detecting means including means to generate a signal responsive to a detected resistance heating element which varies from a given value when said resistance heating elements are connected to said power supply means,

said control means being operably connectable to each of said resistance heating elements to selectively connect said resistance heating elements to the power supply for a selected test period of time;

whereby either the failure or operation of a resistance heating element can be detected by the detection of a signal indicating increased resistance.

4,996,488

MEASURING AND LIMITING EMI WITH A SELECTABLE MODE REFLECTION NETWORK

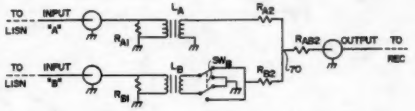
Mark J. Nave, 11833 93rd Ave. North, Seminole, Fla. 33542

Continuation-in-part of Ser. No. 356,074, May 24, 1989, and a continuation-in-part of Ser. No. 103,398, Oct. 1, 1987, Pat. No. 4,849,685. This application Sep. 22, 1989, Ser. No. 411,276

The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.

Int. Cl.[5] G01R *27/00*

U.S. Cl. 324—613 **11 Claims**



1. Selectable mode rejection network (SMRN) useful in the measurement of electromagnetic interference (EMI) from electrical equipment powered from electrical transmission lines through respective line impedance stabilization networks (LISNs), by means of an EMI receiver (REC), such measurement being useful in the design of filters for limiting EMI conducted emissions (CE) to such lines, comprising

a pair of first circuit elements, each having a given first resistive impedance, adapted to connect in series between the respective transmission line LISNs and ground, and

a like pair of second circuit elements, each having a given resistive impedance unlike the first, connected respectively in series between such first circuit elements and a junction between them and the REC lead, and

another such second circuit element connected in series between such junction and such REC lead; and

phase-switching means between one of such first circuit elements and such junction adapted to switch between two positions,

being effective in one position to add CM CE from both lines and to cancel out DM CE from both lines, and

being effective in the other position to add DM CE from both lines and to cancel out CM CE from both lines.

4,996,489

LABORATORY TECHNIQUE FOR MEASURING COMPLEX DIELECTRIC CONSTANT OF ROCK CORE SAMPLES

Paul L. Sinclair, Clear Lake Shores, Tex., assignor to Halliburton Logging Services, Inc., Houston, Tex.

Filed Mar. 31, 1989, Ser. No. 331,332

Int. Cl.[5] G01R *27/04*

U.S. Cl. 324—639 **14 Claims**

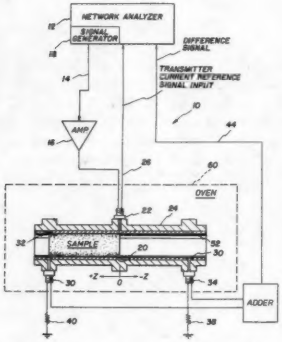
1. A method of measuring the complex dielectric constant of a core sample obtained from a formation of interest comprising the steps of:

(a) placing a cylindrical core sample from a formation of interest in a first cavity at a specified temperature and pressure;

(b) positioning along a cylindrical wave guide

(1) a transmitter coil for forming an electromagnetic wave in the wave guide;

(2) a first receiver coil spaced along the wave guide from the transmitter coil;
(3) a second receiver coil spaced along the wave guide from the transmitter coil;
(4) wherein the first receiver coil and transmitter coil define a first cavity; and
(5) wherein the second receiver coil is spaced oppositely the first receiver coil and defines a second cavity opposite the first cavity;



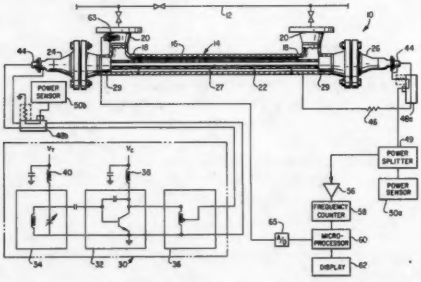
(c) transmitting a signal from the transmitter coil along the wave guide;
(d) forming first and second received signals at the first and second receiver coils; and
(e) responding to the first and second received signals to encode a dielectric measurement in the signal as a function of materials in the cavities.

4,996,490

MICROWAVE APPARATUS AND METHOD FOR MEASURING FLUID MIXTURES

Bentley N. Scott, Richardson, and Y. Sam Yang, Plano, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 932,068, Nov. 18, 1986, Pat. No. 4,862,060. This application Jul. 7, 1989, Ser. No. 376,782
The portion of the term of this patent subsequent to Aug. 29, 2006, has been disclaimed.
Int. Cl.[5] G01R *27/04*; G01N *22/00*
U.S. Cl. 324—639 **17 Claims**



1. Apparatus for measuring the concentration of one fluid such as water in a fluid mixture which includes another fluid such as oil using the alteration of microwave energy characteristics, said apparatus comprising:

means forming a measurement section including means forming a coaxial microwave transmission line including an outer conductor comprising a conduit for said fluid mixture and a center conductor extending within said conduit;

means forming a sheath around said center conductor and having a low dielectric loss tangent so as to minimize the termination of an electrical field being propagated through the transmission line due to the conductivity of said fluid mixture; and

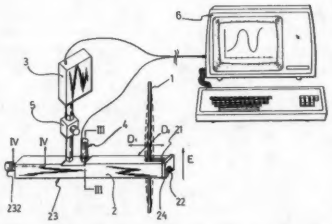
an oscillator circuit operably connected to said transmission line for generating microwave energy for propagation through said measurement section at an operating frequency which changes with a change in the complex impedance of the oscillator load which includes the properties of said fluid mixture in said measurement section.

4,996,491

MEASUREMENT OF THE POSITION OF AN ELONGATED ELEMENT

John Vandorpe, Zulte, Belgium, assignor to N.V. Bekaert S.A., Zwevegem, Belgium

Filed Jun. 7, 1989, Ser. No. 363,259
Claims priority, application European Pat. Off., Jul. 19, 1988, 88201564.7
Int. Cl.[5] G01N *22/00*
U.S. Cl. 324—644 **7 Claims**



1. A method for measuring the linear position of an elongated electrically conductive element, comprising the steps of:
(1) providing a transmission medium, the transmission medium comprising a microwave circuit having an emitter of microwaves and a receiver of microwaves, the medium having a pair of ends, the elongated element being positioned at a first end and a movable short being positioned at a second end;
(2) generating an asymmetrical standing wave by reflecting microwaves on the movable short and on the elongated element, the standing wave having a saw-tooth form with two substantially linear flanks, one flank being longer than the other; and
(3) determining the position of the elongated element by measuring with the receiver the amplitude of the longer flank.

4,996,492

PROBE FOR INSPECTING COUNTERSUNK HOLES IN CONDUCTIVE BODIES

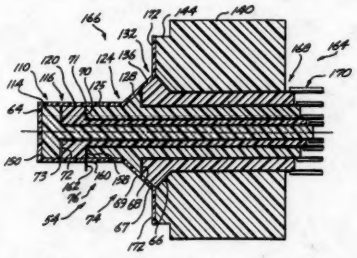
Patrick L. Anderson, Bellevue; Dennis P. Sarr, Kent, and Mark B. Simpson, Everett, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Mar. 7, 1989, Ser. No. 320,314
Int. Cl.[5] G01R *27/26*
U.S. Cl. 324—687 **24 Claims**

1. A probe for inspecting holes in conductive bodies, said probe comprising:
(a) a housing;
(b) a dielectric body attached to said housing for insertion into a hole having a selected diameter, said body having an outer surface with a diameter less than the selected diameter;

(c) at least one measuring electrode mounted in said body, said at least one measuring electrode having a tip located on the outer surface of said dielectric body suitable for forming a fringe field capacitor electrode;

(d) a dielectric shell covering said dielectric body including said at least one measuring electrode tip, said shell having a thickness such that the diameter of the outer surface of



said shell is substantially equal to said selected diameter; and,

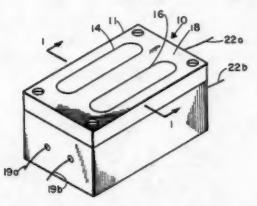
(e) a grounding electrode mounted in said dielectric body, said grounding electrode including a conductive element extending through said dielectric body and said dielectric shell for establishing a conductive path to a conductive body when said probe is mounted in a hole of said selected diameter formed in said conductive body.

4,996,493

INSTANTANEOUS ICE DETECTION SYSTEM

Seymour M. Monat, 4 Hollis Ct., Centerport, N.Y. 11721, and Robert A. Monat, 9011 Butternut Ct., Indianapolis, Ind. 46260

Filed Aug. 21, 1989, Ser. No. 396,074
Int. Cl.[5] G01R *27/22*; G08B *19/02*
U.S. Cl. 324—699 **9 Claims**



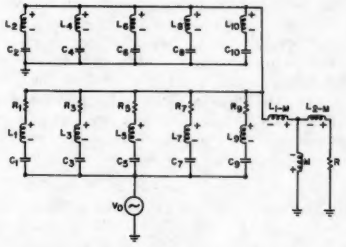
1. Apparatus for the early detection of ice on an instantaneous basis on a surface comprising sensor means embedded in said surface, said sensor means comprising a block of non-conductive material containing a pair of spaced electrodes of conductive, metallic material and having surfaces contiguous with or elevated slightly above the surface of said block and the surrounding surface, means for measuring instantaneously the electrical resistance between said electrodes, means for measuring electrode temperature to indicate the temperature of said surface, and means responsive to said measuring means for producing a signal indicating instantaneously the presence of ice when both said electrode temperature and said resistance simultaneously undergo a discontinuity indicating the freezing of water.

4,996,494

DROOP COMPENSATED PFN DRIVEN TRANSFORMER FOR GENERATING HIGH VOLTAGE, HIGH ENERGY PULSES

Peter M. Ranon, Albuquerque, N. Mex., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jun. 15, 1989, Ser. No. 366,944
Int. Cl.[5] H03K *3/01*
U.S. Cl. 328—65 **16 Claims**



11. A droop compensated pulse forming network driven transformer system which receives a voltage signal from a source, and which outputs a transformed droop compensated rectangular pulse to a variably resistive load, said transformed droop compensated rectangular pulse having a selected voltage level, a selected current value, a selected pulse width, and droop compensated rectangular pulse shape which remains a constant power pulse as it is output to said variably resistive load, said droop compensated pulse forming network driven transformer system comprising:

a means for producing a rectangular pulse, said rectangular pulse producing means being electrically connected between said voltage source and said variably resistive load so that it receives and processes said voltage signal from said voltage source to output a droop compensated rectangular pulse with said selected pulse width T, at a PFN (pulse forming network) frequency F, with a first voltage level and a first current value wherein said rectangular pulse producing means comprises a first bank of inductor and capacitor elements which are electrically connected between a common electrical ground and said transformer, said first bank of inductor and capacitor elements including a plurality of strings which each contain an inductor and a capacitor which are electrically connected in a series circuit between said ground and said transformer such that each inductor in said first bank has an inductance value given by $L_n=\frac{1}{4}RT/L_2$ where R equals an average impedance of said variably resistive load, T equals said pulse width, and L_2 is the self inductance value of said secondary inductor of said transformer, and wherein each capacitor in said first bank has a value given by $C_n=2RT/L_2)n^2\pi^2$ where n is an even integer which begins with 2 and increases for each string in said first bank; and

a second bank of inductor and capacitor elements which are electrically connected between said voltage source and said transformer at a point where said first bank is electrically connected with said transformer, said second bank of inductor and capacitor elements including a plurality of strings which each contain an inductor, a capacitor and a resistor which are electrically connected in a series circuit between said voltage source of said transformer such that each inductor in said second bank has an inductance value given by $L_n=\frac{1}{4}+2(RT/L_2)$ and wherein each capacitor in said second bank has a value given by $C_n=(2RT/L_2)/n^2\pi^2$ where n is an odd integer which begins with 1 and which increases for each string in said second bank; and

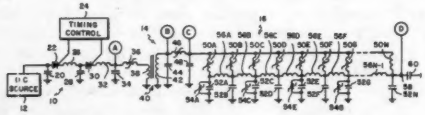
a means for transforming said droop compensated rectangular pulse from said first voltage level and said first current value into said selected voltage level and said selected current value while retaining said selected pulse width and said PFN (pulse forming network) frequency to produce thereby said transformed droop compensated rectangular pulse, said transforming means electrically connected said producing means with said variably resistive load, wherein said transforming means comprises a clock spring wound transformer which is electrically connected between said producing means and said variably resistive load, and which contains a primary inductor with a self inductance of L_1, and a secondary inductor with a self inductance value of L_2, said clock spring wound transformer having a ratio of winding turns between said secondary inductor and said primary inductor that is selected in order to transform said first voltage level and said first current value of said producing means respectively into said selected voltage level and said selected current value.

4,996,495

METHOD AND APPARATUS FOR GENERATING PULSED RF POWER

Daniel L. Birx, Oakley, Calif., assignor to Science Research Laboratory, Inc., Somerville, Mass.

Filed Dec. 2, 1988, Ser. No. 278,810
Int. Cl.[5] H03K *3/01*
U.S. Cl. 328—65 **27 Claims**



1. A pulsed RF power source comprising:
means for generating a DC pulse signal;
means for compressing said DC pulse signal to increase its power to a predetermined level;
a multistage frozen-wave generator, each stage of said generator having a capacitive element and an inductive element, the values of said elements determining the RF frequency of said source;
means operative when the output from the compressing means reaches a predetermined level for rapidly charging the capacitive elements of said frozen-wave generator, said means including means for causing the charge on the capacitive elements for alternative ones of said stages to be different from the charge on the capacitive elements for the remaining stages;
means, including said induction elements, for propagating the charges stored in the capacitors of said frozen-wave generator through said generator to the last stage thereof; and
means for taking the RF output signal at the output from the last stage of the frozen-wave generator.

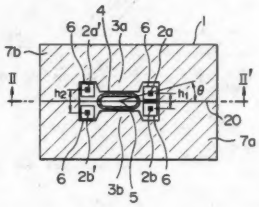
25. A method of generating a pulsed RF power signal comprising the steps of:
generating a DC pulse signal;
compressing said DC pulse signal to increase its power to a predetermined level;
utilizing the output of said compressing step to charge a multistage frozen-wave generator, said charging step including the step of causing the level and/or polarity of alternate stages of said generator to be different from the level and/or polarity of the remaining stages;
propagating the stored charges through the generator to the last stage thereof; and
taking the RF output signal at the output from the last stage of the frozen-wave generator.

4,996,496

BENDING MAGNET

Masashi Kitamura; Takashi Kobayashi; Shunji Kakiuchi; Kiyoshi Yamaguchi; Hiroshi Tomeoku, all of Hitachi; Naoki Maki, Ibaraki; Jyoji Nakata, Kawasaki, and Yasumichi Uno, Isehara, all of Japan, assignors to Hitachi, Ltd. and Nippon Telegraph and Telephone Corp., both of Tokyo, Japan

Filed Sep. 9, 1988, Ser. No. 242,126
Claims priority, application Japan, Sep. 11, 1987, 62-226362
Int. Cl.[5] H05H *13/04*
U.S. Cl. 328—228 **10 Claims**



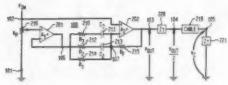
1. A bending magnet comprising:
a core which is substantially sectoral or semi-circular in horizontal sectional configuration and in which opposed magnetic poles are formed and a gap is formed between said opposed magnetic poles for disposing a vacuum chamber for storage of a charged particle beam; and
a pair of upper and lower exciting coils for generating a bending magnetic field in the gap, said pair of exciting coils having a vertical sectional configuration, as viewed along a plane vertical to an orbit of the charged particle beam, which is unchanged over a whole length of the bending magnet in a direction of said orbit and asymmetrical with respect to a line vertically intersecting with a line of said orbit, a vertical distance between said upper and lower exciting coils measured at an outer circumference side of said orbit in said vertical sectional configuration being larger than that measured at an inner circumference side of said orbit, so as to make uniform the distribution of the magnetic flux over the whole length of the bending magnet.

4,996,497

CABLE COMPENSATION CIRCUIT

Glenn C. Waehner, New Canaan, Conn., assignor to American Dynamics Corporation, Orangeburg, N.Y.

Filed Jun. 5, 1989, Ser. No. 361,404
Int. Cl.[5] H03F *1/00*; H03H *5/00*
U.S. Cl. 330—151 **14 Claims**



1. Circuitry for compensating an input signal comprising:
a network, responsive to the input signal, having a network transfer function of the form AKG(s), where A is a gain factor, K represents a selected portion of the input signal and G(s) represents a function of complex frequency s characterized by at least two finite zeros (a, c) and at least one finite pole (b) with $a<b<c$; and
a summation device having as inputs both the input signal

and an output providing said network transfer function from said network,

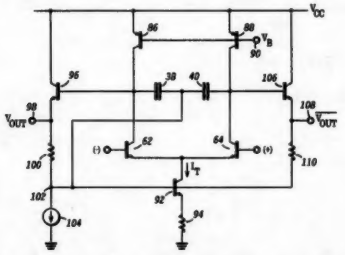
wherein the circuitry has an overall transfer function, obtained at an output of said device, characterized by poles that are the poles of said network and zeros that are determined by A, K and said at least two zeros, and wherein A, K, said at least two finite zeros and said at least one finite pole are chosen to provide variations in the input signal over pre-determined frequency regions of the input signal.

4,996,498

COMMON MODE COMPENSATION FOR DIFFERENTIAL INTEGRATING FILTER

John E. Hanna, Mesa, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 3, 1990, Ser. No. 460,481
Int. Cl.[5] H03F 3/45
U.S. Cl. 330—258 7 Claims



6. A filter cell having common mode compensation for use in a differential differentiating filter, comprising:

a transconductance amplifier that includes:

a. first and second transistors each having a base, and emitter and a collector, said bases being coupled respectively to first and second inputs of the filter cell and said emitters being interconnected;

b. first current supply means coupled to said collectors of said first and second transistors for providing current thereto;

c. a third transistor having a base, an emitter and a collector, said collector being coupled to said interconnected emitters, said emitter being coupled to a power supply conductor;

d. first circuit means for coupling said collector of said first transistor to a first output of the amplifier;

e. second circuit means for coupling said collector of said second transistor to a second output of the amplifier;

f. first and second resistors coupled between a circuit node and said first and second outputs of the amplifier respectively;

g. second current supply means coupled between said circuit node and said power supply conductor; and

h. means for coupling said base of said third transistor to said circuit node;

first and second capacitors series coupled between said collectors of said first and second transistors; and

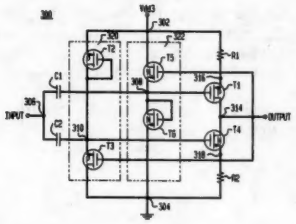
means for coupling the base of said third transistor to the interconnection between said first and second capacitors.

4,996,499

AMPLITUDE STABILIZED OSCILLATOR AMPLIFIER

Seyed R. Zarabadi, Columbus, Ohio, and Linh N. Pham, Kokomo, Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed Sep. 15, 1989, Ser. No. 407,842
Int. Cl.[5] H03F 3/26, 3/16
U.S. Cl. 330—264 19 Claims



1. An amplifier comprising:

first and second complementary output transistors; and

first and second independent negative feedback circuit means coupled to the first and second transistors, respectively, for independently controlling the operating voltages of said output transistors

said feedback circuit means each comprising transistor circuit which are physically proportioned relative to their respective output transistors to achieve substantially equal sensitivity control at upper and lower limits of amplitude of an amplifier output signal

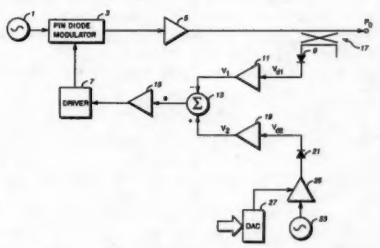
each of said output transistors having a first output terminal respectively connected to first and second potential sources via compensating resistors having a negative temperature coefficient.

4,996,500

AUTOMATIC CONTROL SYSTEM

Ronald K. Larson, Mountain View, and John L. Imperato, Palo Alto, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 24, 1989, Ser. No. 426,637
Int. Cl.[5] H03G 3/30
U.S. Cl. 330—279 9 Claims



1. An automatic control system for controlling the output power level of a signal generator across a wide range of temperatures, comprising:

dual monolithic logarithmic amplifier means connected for logarithmically amplifying reference level signals and the output signals of a signal generator, respectively;

first and second detector means coupled to respective ones of the dual logarithmic amplifier means for detecting the power level of the signal generator and of the reference level signals, respectively, with the first and second detectors being of substantially identical design and construc-

tion and, further, being in thermal contact with one another;

summing means connected to sum output signals from each of the dual monolithic logarithmic amplifier means; and

modulating means responsive to output signals from the summing means for modulating the output of the signal generator to maintain constant output power.

4,996,501

AMPLIFIER CIRCUIT HAVING GAIN CONTROL

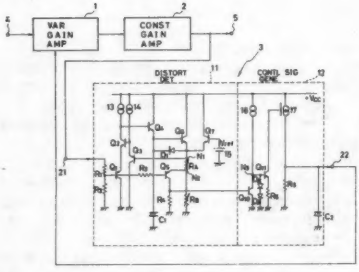
Yoshiaki Sano, Yokohama; Toshio Hanazawa, Kasugai, and Yoshiro Yoshino, Nagoya, all of Japan, assignors to Fujitsu Limited, Kawasaki and Fujitsu VLSI Limited, Kasugai, both of, Japan

Filed Dec. 19, 1988, Ser. No. 286,610

Claims priority, application Japan, Dec. 18, 1987, 62-320817

Int. Cl.[5] H03G *3/30*

U.S. Cl. 330—279 **12 Claims**



1. An amplifier circuit comprising:

variable gain amplifier means having a variable gain, for amplifying an input signal by the variable gain in accordance with a control signal, and for providing an output responsive to the variable gain amplification;

constant gain amplifier means having a constant gain, for amplifying a signal responsive to the signal outputted from said variable gain amplifier means and for providing an output responsive to the constant gain amplification; and

gain control circuit means, responsive to the signal outputted from said control constant gain amplifier means, for supplying the control signal to said variable gain amplifier means during a time period in which a level of the output signal of said constant gain amplifier means is higher than a reference level which is a predetermined value lower than a peak value of the output signal of said constant gain amplifier means, and for adjusting said reference level based on the output of said constant gain amplifier means.

4,996,502

ULTRASONIC ATOMIZER CIRCUIT HAVING PLURAL OSCILLATORS

Shinichi Endo, Chiba, Japan, assignor to TDK Corporation, Tokyo, Japan

Filed Sep. 29, 1989, Ser. No. 415,102

Claims priority, application Japan, Oct. 1, 1988, 63-128015[U]

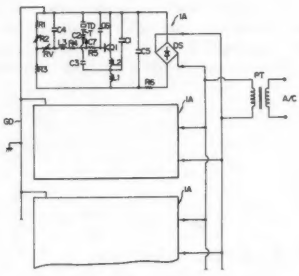
Int. Cl.[5] H03B *5/36;* **B05B** *17/06*

U.S. Cl. 331—46 **4 Claims**

1. An ultrasonic atomizer circuit comprising a plurality of unit oscillation circuits each coupled commonly with a secondary winding of a single common transformer (PT) through a rectifier circuit (DS),

each of said unit oscillator circuit comprising a transistor (Q1) with a grounded collector, a piezo-electric vibration element (TD) coupled across said collector and a base of said transistor, a capacitor C1 coupled across an emitter and said collector of said transistor (Q1), and a capacitor (C3) coupled across said base and said emitter of said transistor (Q1),

wherein the improvement comprises another capacitor (C7) coupled between a junction point of one end of said vibration element (TD) and one end of said capacitor (C3), and the base of said transistor (Q1), so that said capacitor (C3) is separated from said base circuit of the transistor (Q1) for DC current.



4,996,503

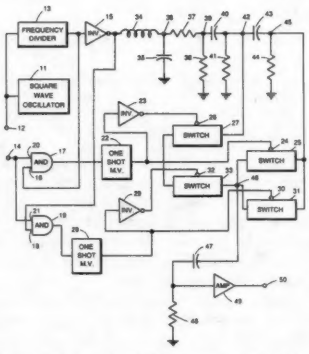
PHASE MODULATOR CIRCUIT FOR ENCODING TWO BINARY DIGITS PER CYCLE OF SINE WAVE CARRIER

William Hotine, 633 Ramona Ave. #23, Los Osos, Calif. 93402

Filed Jun. 21, 1990, Ser. No. 541,825

Int. Cl.[5] H04L *27/20;* **H03C** *3/00*

U.S. Cl. 332—104 **3 Claims**



1. A phase modular circuit for encoding two binary digits per cycle of carrier frequency comprising:

a square wave oscillator having an output at the clock frequency;

a frequency divider receiving the clock frequency output of said oscillator and having a square wave output of one-half said clock frequency;

a first inverter receiving the output of said frequency divider and having an output of an inverted half clock frequency;

a first AND gate receiving the square wave output of said frequency divider at its first input;

a second AND gate receiving the output of said first inverter at its first input;

externally generated serial binary digital data clocked by said clock frequency driving the second inputs of said first and second AND gates;

a first one shot multivibrator triggered by the output of said first AND gate and having a pulse output driving a second inverter;

a second one shot multivibrator triggered by the output of said second AND gate and having a pulse output driving a third inverter;

a low pass filter circuit for converting the square wave output of said first inverter to a sine wave carrier;

a first phase shift circuit for synchronizing the phase of the sine wave carrier with the square wave half clock frequency;

a second phase shift circuit receiving said carrier and having a phase shifted carrier output;

a first semiconductor bilateral switch having a control terminal driven by the output of said second inverter and with its input receiving said carrier frequency;

a second semiconductor bilateral switch having a control terminal driven by the output of said third inverter, with its input receiving the output of said first semiconductor bilateral switch and with its output coupled to an output circuit;

a third semiconductor bilateral switch having a control terminal driven by the output of said first one shot multivibrator with its input receiving the output of said second phase shift circuit and with its output coupled to an output circuit;

a fourth semiconductor bilateral switch having a control terminal driven by the output of said second one shot multivibrator, with its input receiving the output of said second phase shift circuit and with its output coupled to an output circuit and

said AND gates receiving serial binary digital data at their second inputs and being enable alternately by said half clock frequency and its inversion to control said semiconductor bilateral switches in a manner to connect said carrier or pulsed phase deviations of said carrier to said output circuit whereby successive input serial binary digits are encoded at the successive zero crossing points of the carrier.

4,996,504

MONOLITHICALLY INTEGRATABLE MICROWAVE ATTENUATION ELEMENT

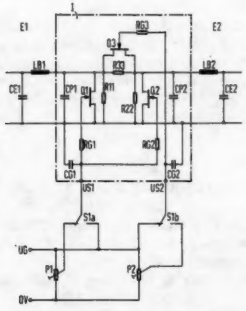
Jakob Huber, Beyharting, and Wolfgang Meier, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 15, 1989, Ser. No. 407,736

Claims priority, application European Pat. Off., Sep. 30, 1988, 88116232.5

Int. Cl.[5] H03H *11/28*

U.S. Cl. 333—81 R **17 Claims**



1. A monolithically integratable microwave attenuation element that has at least three field effect transistors (Q1, Q2, Q3) arranged in a PI structure, the PI structure having at least two terminal ports for a signal path and having control terminals, comprising drain-source paths of the field effect transistors (Q1, Q2, Q3) arranged in a PI configuration; a respective resistor (R11, R22, R33) connected parallel to each of the drain-source paths of the field effect transistors (Q1, Q2, Q3) arranged in the PI configuration; and a capacitor (CP1, CP2) connected in parallel with each of the terminal ports, the respective capacitor forming a line simulation of concentrated elements together with inductances (LB1, LB2) of leads connected to the terminal ports and together with external capacitors (CE1, CE2) connected to the terminal ports.

4,996,505

FREQUENCY TRIPLICATOR FOR MICROWAVES

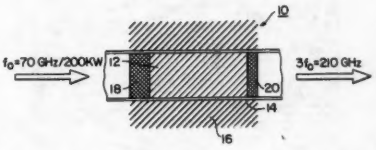
Fritz Keilmann, Stuttgart, Fed. Rep. of Germany, assignor to Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V., Fed. Rep. of Germany

Filed Mar. 29, 1989, Ser. No. 330,332

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1988, 3811116

Int. Cl.[5] H02M *5/20*; H03B *19/14*

U.S. Cl. 333—218 **8 Claims**



1. A frequency triplicator for microwaves comprising a body of a nonlinear material having an input end, adapted to receive microwave energy of a base frequency, and an output end, said microwave energy interacting with the material of said body so that electromagnetic energy containing microwave energy of three-times said base frequency emerges from said output end, wherein said base frequency is more than 30 GHz and the nonlinear material is a semiconductor material having a carrier concentration less than 10^{13} cm^{-3}.

4,996,506

BAND ELIMINATION FILTER AND DIELECTRIC RESONATOR THEREFOR

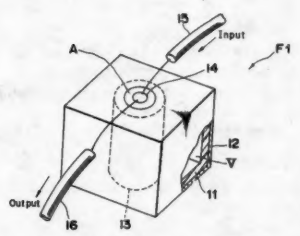
Youhei Ishikawa, Kyoto; Toshiro Hiratsuka, Muko; Hirotsugu Abe, Yokaichi; Hisashi Takagaki, and Sadao Yamashita, both of Kyoto, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Sep. 28, 1989, Ser. No. 414,133

Claims priority, application Japan, Sep. 28, 1988, 63-243173; Sep. 28, 1988, 63-126591[U]

Int. Cl.[5] H01P *7/10, 1/20*

U.S. Cl. 333—219.1 **13 Claims**



1. A dielectric resonator which comprises a ceramic casing having at last one dielectric column disposed in a cavity thereof and said casing having an electrically conductive film formed over its outer surface, an electrode constituted by a metallic film formed on the outer surface of said ceramic casing, separated from said electrically conductive film by a gap, and opposing an end of said dielectric column through a por-

tion of said casing, and connecting lines for connecting said electrode with an external circuit.

4,996,507

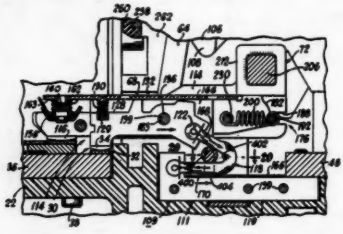
CT QUICK CHANGE ASSEMBLY AND FORCE TRANSMITTING SPACER

Jere L. McKee, New Castle; Glenn R. Thomas, Beaver; Lance Gula, Aliquippa, and William E. Beatty, Jr., Beaver, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 226,648, Aug. 1, 1988. This application Oct. 11, 1989, Ser. No. 420,088

Int. Cl.[5] H01H *53/02, 9/44*

U.S. Cl. 335—195 **20 Claims**



1. A circuit breaker comprising:

one or more pairs of separable contacts each defining a stationary contact and a movable contact, each pair of separable contacts defining a pole;

one or more line side conductors, each line side conductor electrically connected to said stationary contact;

one or more load-side connectors;

one or more flexible shunts electrically connected between each of said movable contacts and said load-side conductors;

each of said shunts formed as V-shaped members defining a bight portion, a first depending leg, connected to said movable contact and a second depending leg connected to said load-side conductor, defining a first parallel current path between said first depending leg and said second depending leg and a second parallel current path between said second depending leg and said load-side conductor, said second parallel current path causing compression of said first depending leg with respect to said second depending leg at a predetermined magnitude of current; and

reducing means cooperable with said depending legs for reducing compression of said shunts during overcurrent conditions.

4,996,508

TEMPORAL AND SPATIAL CONTROL OF FIELD TOPOLOGIES IN SOLENOIDS

Aharon Z. Hed, Nashua, N.H., assignor to International Superconductor Corp., Riverdale, N.Y.

Filed Mar. 21, 1989, Ser. No. 334,583

Int. Cl.[5] H01F *7/22*

U.S. Cl. 335—216 **19 Claims**

1. An apparatus for producing a topologically modifiable magnetic field, comprising:

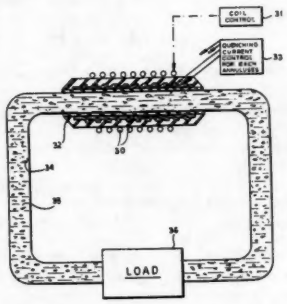
a solenoid coil;

a multiplicity of superconducting annuluses disposed within said coil and axially spaced apart therein;

means for at least selectively cooling said annuluses to a temperature below the critical temperature for superconductivity of said annuluses;

means for electrically energizing said coil to produce a magnetic field; and

means for selectively quenching superconductivity of said annuluses so that certain of said annuluses can be rendered nonsuperconductive while at least one of said



annuluses is in a super conductive state to modify the topology of the magnetic field produced by said coil.

4,996,509

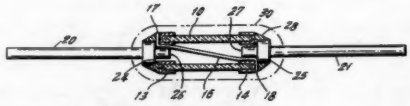
MOLDED CAPLESS FUSE

Elliot Bernstein, Ridge Rd., Glen Cove, N.Y. 11542

Filed Aug. 25, 1989, Ser. No. 398,616

Int. Cl.[5] H01H *85/16*

U.S. Cl. 337—232 **14 Claims**



1. A capless electric fuse comprising:

an electrically non-conductive, hollow sleeve, the sleeve having opposite ends; at least one of the ends of the sleeve being metallized;

a fusible element extending through the sleeve and having a length so as to have first and second ends which are engageable with the ends of the sleeve;

a respective lead for attachment to the metallized end of the sleeve, said lead having an end portion, and the lead being attached to the respective metallized end in the vicinity of the end portion of the lead; and

the end portion, and the respective first end of the fusible element, and the respective metallized end of the sleeve being soldered together, said lead and said first end of said fusible element being secured to each other and to said metallized end of said sleeve by said soldering, no end cap being present on the sleeve.

4,996,510

METAL OXIDE VARISTORS AND METHODS THEREFOR

Paul Becker, San Francisco; Carol Powers, Redwood City, and Mark S. Thompson, San Carlos, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed Dec. 8, 1989, Ser. No. 447,748

Int. Cl.[5] H01C *7/10*

U.S. Cl. 338—21 **15 Claims**

1. A varistor comprising a primary varistor metal oxide, aluminum in an amount of about 1 to about 30 parts per million (ppm), about 0.1 to about 0.5 mole % bismuth, about 0.1 to about 1.5 mole % antimony, about 0.1 to about 1 mole % chromium, about 0.1 to about 1.0 mole % manganese, about 0.1 to about 2.0 mole % cobalt, and about 0 to about 1.0 mole % boron, each of said elements being present in the form of its

oxide and said varistor having a DC leakage current at 80% of $V_{1ma/cm2}$ of less than 1.0×10^{-7} amp/cm^2.

4,996,511

PRESSURE-SENSITIVE RESISTANCE ELEMENT

Kazuhiro Ohkawa, Gunma, and Taro Yamazaki, Kanagawa, both of Japan, assignors to Toshiba Silicone Co., Ltd., Tokyo, Japan

Filed May 4, 1989, Ser. No. 347,088
Claims priority, application Japan, May 9, 1988, 63-112203
Int. Cl.[5] H01C *10/10*
U.S. Cl. 338—114 **13 Claims**

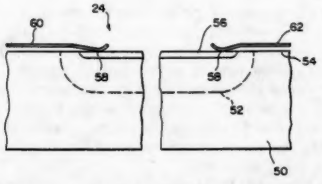
1. A pressure-sensitive resistance element comprising a first contact electrode formed on a first electrically insulating base plate, a second contact electrode formed on a second electrically insulating base plate disposed facing the first contact electrode, a pressure-sensitive electrically conductive layer formed on the whole surface of at least one of the first and second contact electrode regions, and a pressure-sensitive electrically conductive pattern formed on at least one of the pressure-sensitive electrically conductive layers or the pressure-sensitive electrically conductive layer and the contact electrode having no pressure-sensitive electrically conductive layer thereon.

4,996,512

OVERVOLTAGE RESISTOR AND METHOD FOR ITS MANUFACTURE

Bruce E. Byrkett, King County, Wash., assignor to Seattle Silicon Corporation, Bellevue, Wash.

Filed Apr. 13, 1989, Ser. No. 338,080
Int. Cl.[5] H01C *1/012, 1/02, 7/12*
U.S. Cl. 338—306 **13 Claims**



1. A resistance element for placement in an integrated circuit formed near a surface of a substrate material of a first conductivity type, the integrated circuit being connected to one or more supply voltages, comprising:

a well formed in the substrate material, said well having a conductivity type opposite to the first conductivity type and being electrically isolated from the supply voltages; and

a resistive layer made from a material of the first conductivity type and formed in said well.

11. A method for forming a resistance element near a surface of a substrate material of a first conductivity type, comprising the steps of:

a. forming an electrically-isolated well in the substrate material, said well having a conductivity type opposite to the first conductivity type; and

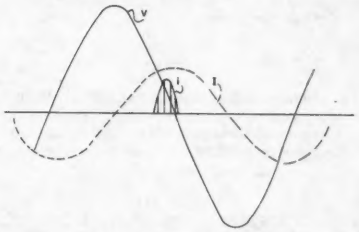
b. forming a resistive layer in said well, said resistive layer being made from a material of the first conductivity type.

4,996,513

CARRIER STABILITY ERASURE FILLING SYSTEM FOR COMMUNICATIONS OVER ELECTRICITY DISTRIBUTION NETWORK

Sioe T. Mak; Richard L. Maginnis, and Kevin J. Franzen, all of St. Louis County, Mo., assignors to Emerson Electric Co., St. Louis, Mo.

Filed Feb. 20, 1990, Ser. No. 481,247
Int. Cl.[5] H04M *11/04;* H04J *1/12*
U.S. Cl. 340—310 R **20 Claims**



1. In a communication system using the current waveform of an electricity distribution network as a carrier a signal being present as composite binary digits, each composite binary digit being defined by a pulse pattern at preselected positions on the voltage waveform, the pulses being spaced along the waveform so that they are ordered in time, the pulse pattern for a binary "1" being complementary to the pulse pattern for a binary "0", a system for identifying said binary digits comprising:

sampling the current waveform at the preselected positions to obtain an ordered set of waveform values, the magnitudes of the values corresponding to a binary digit pulse pattern being larger, in a noise-free system, when the binary digit corresponding to that pulse pattern is present than when it is absent;

examining the ordered waveform values for each bit to determine if the values fall within preset criteria indicative of a stable carrier;

when the ordered waveform values for a particular bit all fall within the preset criteria, identifying that particular bit as having the binary value corresponding to its sampled pulse pattern;

when at least some of the ordered waveform values for a particular bit fall outside the preset criteria, labelling that particular bit as suspect;

for each suspect bit, testing the ordered values of that bit and of adjacent bits to determine whether a series of a first predetermined number of successive values meets the preset stability criteria, said series including at least a second predetermined number of successive values from the suspect bit and at least the second predetermined number of successive values from an adjacent bit; and

identifying the binary value, if any, of the suspect bit based upon said second predetermined number of successive values from the suspect bit when the test of the testing step is met, otherwise labelling the suspect bit as uncorrectable.

4,996,514

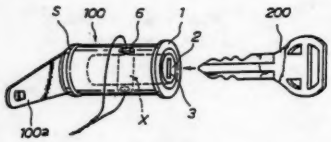
CAR THEFT PROOFING SYSTEM

Sadakatsu Sunami, 8-3, Asukanokita 3-chome, Ikoma-shi, Nara-ken, Japan

Filed Aug. 11, 1989, Ser. No. 392,791
Claims priority, application Japan, Nov. 18, 1988, 63-293411
Int. Cl.[5] B60R *25/10*
U.S. Cl. 340—426 **9 Claims**

1. A car theft proofing system comprising a sensor disposed within a cylinder lock for detecting insertion into the cylinder lock of a door key or other article, an alarm device for giving an alarm, alarm drive means to output a signal for driving the alarm device, control means to cause the alarm device to give

the alarm in response to a signal received from the sensor and the signal received from the alarm drive means, and a radio transmitter for detecting insertion of the article and transmitting a radio wave, wherein said alarm drive means includes a



portable remote control transmitter and a receiver disposed on a car body, said remote control transmitter including abnormality alarm means for transmitting a theft signal in response to the radio wave transmitted from said radio transmitter.

4,996,515

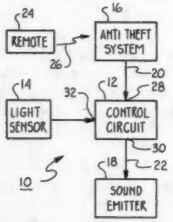
APPARATUS FOR SUPPRESSING AUTOMOBILE ANTI-THEFT ARM/DISARM SYSTEM

Michael Schaffer, 5061 63rd St., San Diego, Calif. 92115, and Gerald J. Teudt, 5447 Por Techo Ct., San Diego, Calif. 92124

Filed Apr. 18, 1990, Ser. No. 510,603

Int. Cl.[5] B60R *25/10*

U.S. Cl. 340—426 **8 Claims**



1. An apparatus for automatically suppressing the audible arm and disarm signal of an automobile anti-theft system, comprising:

circuit means having an input terminal for receiving an alarm signal from an alarm signal generating portion of said automobile anti-theft system, and having an output terminal for providing a modified alarm signal to a sound emitting device; and

light sensing means coupled to said circuit means for generating a light level signal for indicating whether ambient light intensity is above or below a predetermined threshold level;

said circuit means including bypass means responsive to said light level signal being above said threshold level for connecting said input terminal to said output terminal for allowing an alarm signal to energize said sound emitting device;

said circuit means further including suppression means responsive to said light level signal being below said threshold level for disconnecting said input terminal from said output terminal for a predetermined period of time.

4,996,516

INDICATOR OF UNDER INFLATED TIRE

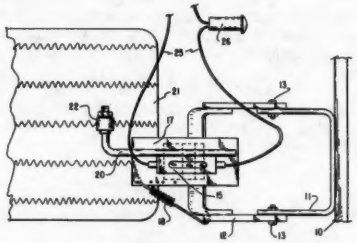
L. Dale Mason, P.O. Box 131, Buffalo, S. Dak. 57720

Filed Nov. 13, 1989, Ser. No. 435,595

Int. Cl.[5] B60C *23/06*

U.S. Cl. 340—443 **6 Claims**

1. For use on a vehicle having a frame and using pneumatic tires, an indicator of tire problems comprising bracket means for attachment to said frame adjacent said tire, switch means mounted to said bracket means, engagement means connected to said switch means extending toward but normally not enaged with said tire, said engagement means adapted to sense



an increase in the diameter of said tires caused by centrifugal force, and indicator means connected to said switch means to indicate the contact of said tire with said engagement means.

4,996,517

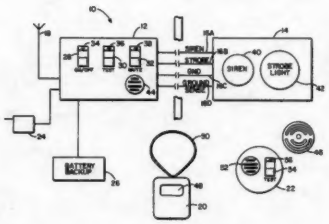
HOUSEHOLD ALARM SYSTEM

Dale E. Kringen, and Thomas D. Culhane, both of Sioux Falls, S. Dak., assignors to Assist, Inc., Sioux Falls, S. Dak.

Filed Apr. 6, 1989, Ser. No. 334,722

Int. Cl.[5] G08B *29/00*

U.S. Cl. 340—506 **7 Claims**



1. An alarm system for a structure comprising:

means for generating coded radio trigger signals;

alarm controller means responsive to coded radio trigger signals for generating alarm actuation signals;

alarm signals generating means for generation of alarm signals in response to the alarm actuation signals;

an alarm actuation signals transmission line connected between the alarm controller means and the alarm signals generating mans; and

means connected to the alarm actuation signals transmission line for determining integrity of the transmission line.

4,996,518

FIRE ALARM SYSTEM

Kaoru Takahashi; Akio Tsumiji, and Ryuji Shutoku, all of Tokyo, Japan, assignors to Nohmi Bosai Co., Ltd., Tokyo, Japan

Filed Jan. 23, 1990, Ser. No. 468,866

Claims priority, application Japan, Jan. 31, 1989, 1-20985

Int. Cl.[5] G08B *26/00*

U.S. Cl. 340—518 **21 Claims**

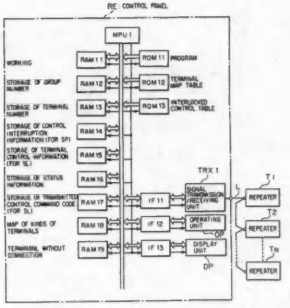
1. A fire alarm system comprising:

a receiver unit connected to a plurality of terminal unit groupings, each of the terminal unit groupings comprised of a plurality of terminal units, each of the terminal units including at least one of a fire sensor and a remote control means for controlling a remote object;

said receiver unit and said plurality of terminal units including means for operating in a system polling mode wherein

all of said plurality of terminal units of said terminal unit groupings are polled, wherein a terminal unit grouping response period is provided for each of said terminal unit groupings, and wherein a group response signal is transmitted from a terminal unit having a change of status to said receiver unit during the terminal unit grouping response period of the terminal unit grouping which includes the terminal unit having a change of status;

said receiver unit and said plurality of terminal units further comprising means for operating in a point polling mode wherein all of the terminal units of the terminal unit grouping from which the group response signal was transmitted during the system polling mode are polled, wherein



a terminal unit response period is provided for each of the terminal units of said terminal unit grouping from which the group response signal was transmitted group the system polling mode, and wherein a terminal unit response signal is transmitted from the terminal unit having a change of status to the receiver unit during the terminal unit response period of the terminal unit having a change of status;

said receiver unit and said plurality of terminal units further comprising means for operating in a selecting mode wherein status information is transmitted to said receiver unit from said terminal unit from which the terminal unit response signal was transmitted during the point polling mode.

4,996,519

METHOD AND APPARATUS FOR MONITORING AN AMPLIFIER

Michael J. D'Antonio, Salem; Irving A. Gibbs, Roanoke; Lawrence J. Lane, Salem, and Rodney A. Lawson, Fincastle, all of Va., assignors to General Electric Company, Salem, Va.

Filed Sep. 25, 1989, Ser. No. 411,977
Int. Cl.[5] G08B *21/00*
U.S. Cl. 340—653 **27 Claims**

11. A system for stabilizing a polyphase synchronous generator providing an output voltage and an output current, through excitation control to dampen generator oscillations comprising:

(a) a power system stabilizer means responsive to generator operating parameters to develop an oscillation signal having an instantaneous magnitude proportional to said generator oscillations;

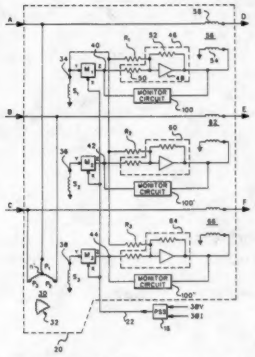
(b) means to develop a plurality of voltage signals representing, respectively, phase output voltages of said generator with respect to neutral;

(c) means to multiply each of said voltage signals by said oscillation signal to yield a corresponding plurality of modulation signals;

(d) an amplifier for each phase of said generator, each of the amplifiers having a prescribed gain and being responsive, respectively, to the sum of a corresponding one of said modulation signals and a one of said voltage signals to provide an associated control signal to control the excitation of said generator; and

(e) means to continuously monitor the operational status of each of the amplifiers including:

(i) means to generate an additional signal by multiplying a selected one of the associated control signal and said modulation signal by a factor representing said prescribed gain;



(ii) means to combine said additional signal and the other of the associated control signal and said modulation signal to yield an error signal; and,

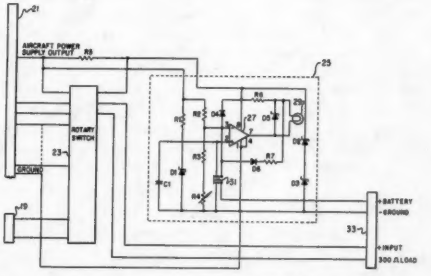
(iii) means responsive to said error signal to provide an alarm signal when said error signal has a value outside a predetermined boundary.

4,996,520

OVERVOLTAGE DETECTION TEST APPARATUS FOR MILITARY AIRCRAFT WEAPONS SYSTEMS

Robert A. Williams, and Stephen Tye, both of Fort Worth, Tex., assignors to Williams Instruments, Inc., Fort Worth, Tex.

Filed Jun. 17, 1988, Ser. No. 208,732
Int. Cl.[5] G08B *21/00*
U.S. Cl. 340—662 **6 Claims**



1. A test apparatus for detecting overvoltage conditions in a power supply that is contained within a military aircraft, said power supply has an output that provides power to missiles mounted on said aircraft, said missiles having a maximum voltage limit, comprising:

(a) electrical connector means for interfacing the test apparatus with said aircraft power supply while said aircraft is on the ground and before said missiles have been loaded onto said aircraft,

(b) electrical comparator means for comparing inputs comprising first and second inputs and an output, said first

input being clamped to a voltage which is representative of said maximum voltage limit, said second input being tied to said aircraft power supply output so as to vary with said power supply output such that said second input voltage exceeds said first input voltage when said power supply output exceeds said maximum voltage limit, said comparator means output connected to warning means, said warning means being activated by said comparator means when said second input voltage exceeds said first input voltage, wherein an overvoltage condition of said aircraft power supply is indicated,

(c) self-test switch means, said self-test switch means when activated connecting said second input to a larger voltage than is connected to said first input, wherein the operation of said comparator means and said warning means can be tested,

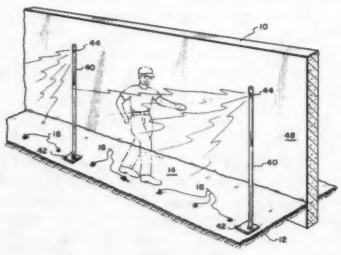
(d) test power supply means separate from said aircraft power supply, said test power supply means being connected with said first and second inputs through said self-test switch means.

4,996,521

INTRUSION DETERRENT APPARATUS

Thomas E. Hollow, 721 Brossard Dr., Thousand Oaks, Calif. 91360

Filed Dec. 20, 1989, Ser. No. 453,693
Int. Cl.[5] G08B *3/00*
U.S. Cl. 340—691 **2 Claims**



1. In combination with a fixed structure, a specific area abutting and including said fixed structure, an intrusion deterrent apparatus mounted in close proximity to said fixed structure, said intrusion deterrent apparatus comprising:

a spraying device capable of spraying water, said spraying device being located within said specific area, said specific area comprising ground, said spraying device comprising a sprinkler mounted on said ground; and

a sensor for detecting the presence of an animal within said specific area, said sensor causing activation of said spraying device thereby encouraging the animal to leave said specific area.

4,996,522

FOLDING ELECTRONIC DEVICE

Hironori Sunano, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sep. 18, 1989, Ser. No. 408,274
Claims priority, application Japan, Sep. 26, 1988, 63-125472[U]
Int. Cl.[5] G09G *3/00*
U.S. Cl. 340—700 **8 Claims**

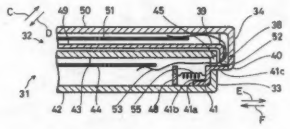
1. A folding electronic device comprising a body containing an electric circuit; a cover member containing another electric circuit; a hinge rotatably connecting a rear end portion of said body with a rear end portion of said cover member for providing said body and said cover member to be freely opened/closed; and an interconnection member electrically connecting said electric circuit contained in said body with said electric circuit contained in said cover member,

said cover member being brought into a forward position about a rotation axis of said hinge to vertically overlap with said body thereby to obtain a closed state of said electronic device,

said cover member being brought into a rear position about said rotation axis of said hinge to obtain an opened state of said electronic device,

said cover member being provided on its rear end portion with a rear wall extending in the same direction as said rotation axis of said hinge and downwardly projecting toward said body,

said body being provided on its rear end portion with a rear



wall extending in the same direction as said rotation axis of said hinge and upwardly projecting toward said cover member,

said rear wall of said cover member being rearwardly displaced beyond said rear wall of said body, a lower end of said rear wall of said cover member being positioned downwardly beyond an upper end of said rear wall of said body in said closed state of said electronic device,

said body further including:

a closing member displaceably provided to rearwardly project from said rear wall of said body to come into contact with said rear wall of said cover member, and

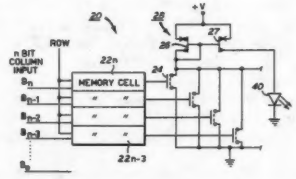
urging means for urging said closing member to retain said closing member in contact with said rear wall of said cover member.

4,996,523

ELECTROLUMINESCENT STORAGE DISPLAY WITH IMPROVED INTENSITY DRIVER CIRCUITS

Cynthia S. Bell, Webster, and Michael J. Gaboury, Spencerport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 20, 1988, Ser. No. 260,103
Int. Cl.[5] G09G *3/30*
U.S. Cl. 340—781 **7 Claims**



1. An electroluminescent storage display with improved intensity driver circuits comprising:

an electroluminescent element;

a plurality of memory elements;

a current source connected in circuit to said electroluminescent element;

a plurality of elements, corresponding in number to said plurality of memory elements, each connected to a respective memory element and responsive to the signals stored therein for causing an incremental current to flow from said current source to said electroluminescent element; and

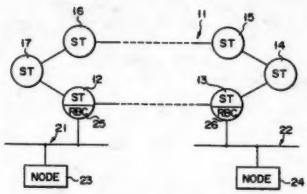
means for applying signals to said memory elements indicative of the intensity desired from said electroluminescent element.

4,996,524

ADDRESS INFORMATION REGISTERING/SEARCHING SYSTEM IN NETWORK SYSTEM

Akihiko Tojima, Tachikawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 28, 1989, Ser. No. 373,054
Claims priority, application Japan, Jun. 30, 1988, 63-160816
Int. Cl.[5] H04B *1/00*
U.S. Cl. 340—825.02 20 Claims



1. An address information registering/searching system in a network system in which a plurality of stations are connected to a trunk network, at least one branch network is connected to each station, and at least one node is connected to each branch network, a node address being assigned to each node, and a branch address being assigned to each branch network, suitable for transmitting data between a first node connected to a first branch network of a first station and a second node connected to a second branch network of a second station, first and second node address being assigned to said first and second nodes, and first and second branch addresses being assigned to said first and second branch networks, comprising:

first and second address table means each for storing a plurality of pieces of address information, each piece of address information including a node address assigned to a certain mode, a branch address assigned to a branch network to which said node is connected, and frequency data representing a search frequency of the address information, said first address table means storing address information having a high reference frequency relative to a first predetermined reference frequency and said second address table means storing address information having a low reference frequency relative to a second predetermined reference frequency;

reading means for receiving a branch frame transmitted from said first node onto said first branch network, the branch frame including a first node address assigned to said first node as a source node address, a second node address assigned to said second node as a destination node address, and data, reading out the source node address from the branch frame and generating a first search command, and reading out the destination node address from the branch frame and generating a second search command;

searching means for referring to said first address table means and selectively referring to said second address table means to search for first object address information in response to the first search command, the first object address information including the first node address and the first branch address, and referring to said first address table means and selectively referring to said second address table means to search for second object address information in response to the second search command, the second object address information including the second node address and the second branch address; and

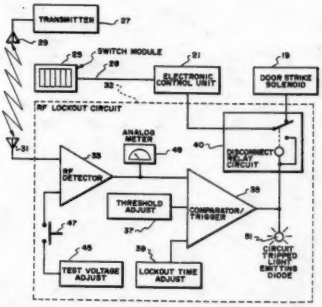
trunk transmitting means for generating a trunk frame including the first branch address written in the first object address information as a source branch address, the second branch address written in the second object address information as a destination branch address, and the branch frame and transmitting the generated trunk frame onto said trunk network.

4,996,525

R. F. LOCKOUT CIRCUIT FOR ELECTRONIC LOCKING SYSTEM

Earl M. Becker, Jr., Camarillo, and Allen Miller, Oxnard, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 24, 1989, Ser. No. 440,950
Int. Cl.[5] H04Q *1/00*; G06F *15/20*
U.S. Cl. 340—825.31 14 Claims



1. An electronic circuit for preventing a door strike solenoid connected to an electronic control unit from being falsely energized by an electrical signal supplied thereto by said electronic control unit, said electronic control unit supplying said electrical signal in response to radio frequency signals generated by a transmitter located near said electronic control unit, said electronic control unit comprising:

means for receiving the radio frequency signals generated by said transmitter;

detector circuit means having an input connected to said receiving means and an output for converting said radio frequency signals to a first direct current voltage having an amplitude indicative of the field strength of said radio frequency signals;

means having an output for generating a reference direct current voltage;

trigger circuit means having a first input connected to the output of said detector circuit means, a second input connected to the output of said generating means and an output for producing a second direct current voltage when the amplitude of said first direct current voltage exceeds said reference direct current voltage;

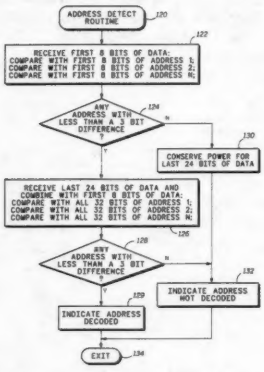
a switching transistor having a base connected to the output of said trigger circuit means, an emitter connected to ground and a collector;

relay circuit means having a normally closed contact connected between said electronic control unit and said door strike solenoid and a coil with one end of said coil being connected to the collector of said switching transistor and the opposite end of said coil being connected to said electronic control unit, the coil of said relay circuit means being energized by the electrical signal from said electronic control unit when said switching transistor is turned on by the second direct current voltage from said trigger circuit means, the normally closed contact of said relay circuit means being opened by said energized coil thereby preventing the electrical signal supplied by said electronic control unit from falsely energizing said door strike solenoid.

4,996,526
POWER CONSERVATION METHOD AND APPARATUS FOR A PORTION OF A SYNCHRONOUS INFORMATION SIGNAL

Michael J. DeLuca, Boca Raton, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 1, 1988, Ser. No. 278,520
Int. Cl.[5] G08B 5/22
U.S. Cl. 340—825.44 **16 Claims**


ADDRESS DETECT ROUTINE
120
RECEIVE FIRST 8 BITS OF DATA:
COMPARE WITH FIRST 8 BITS OF ADDRESS 1;
COMPARE WITH FIRST 8 BITS OF ADDRESS 2;
COMPARE WITH FIRST 8 BITS OF ADDRESS N;
122
ANY ADDRESS WITH LESS THAN A 3 BIT DIFFERENCE
124
CONSERVE POWER FOR LAST 24 BITS OF DATA
130
RECEIVE LAST 24 BITS OF DATA AND COMBINE WITH FIRST 8 BITS OF DATA:
COMPARE WITH ALL 32 BITS OF ADDRESS 1;
COMPARE WITH ALL 32 BITS OF ADDRESS 2;
COMPARE WITH ALL 32 BITS OF ADDRESS N;
126
ANY ADDRESS WITH LESS THAN A 3 BIT DIFFERENCE
128
INDICATE ADDRESS NOT DECODED
132
INDICATE ADDRESS DECODED
129
EXIT
134

1. A reduced power receiver for receiving a transmitted signal comprising a synchronization signal and a plurality of information signals, each information signal having a plurality of portions comprising at least one binary bit signal, the receiver comprising:

synchronization means responsive to the transmitted signal for detecting the synchronization signal and for generating a timing signal indicative of the occurrence of one of said plurality of information signals;

decoding means for decoding a first portion of said plurality of portions of said one of said plurality of information signals and generating a first digital word comprising at least one bit therefrom;

memory means for storing at least one predetermined digital word, each of said at least one predetermined digital word having a plurality of portions comprising at least one bit;

comparison means responsive to the timing signal for comparing said first digital word to corresponding first portions of each of said at least one predetermined digital word and for generating a first undetect signal if said first digital word comprises more than N bits differing from corresponding bits of said first portions of each of said at least one predetermined digital word, where N is an integer greater than zero; and

power conservation means responsive to the first undetect signal for reducing the power consumption of the receiver for subsequent portions of said one of said plurality of information signals.

4,996,527
PIPELINED RESIDUE TO MIXED BASE CONVERTER AND BASE EXTENSION PROCESSOR

Theodore L. Houk, Seattle, and R. Aaron Falk, Renton, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Sep. 29, 1989, Ser. No. 414,019
Int. Cl.[5] H03M 7/18
U.S. Cl. 341—83 **20 Claims**

1. An information processor receiving a residue number as an input, said information processor comprising:

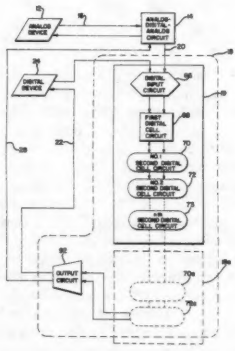
a plurality of arithmetic units arranged in a plurality of sequentially arranged stages, odd stages of said plurality of stages performing first arithmetic operations in parallel, even stages of said plurality of stages performing second arithmetic operations in parallel;

said odd and even stages alternately performing said first operations and said second operations to generate at least one mixed base digit corresponding to said residue number.

4,996,528
APPARATUS HAVING SHARED MODULAR ARCHITECTURE FOR DECIMATION AND INTERPOLATION

Safdar M. Asghar, and John G. Bartkowiak, both of Austin, Tex., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Oct. 30, 1989, Ser. No. 434,271
The portion of the term of this patent subsequent to Feb. 19, 2008, has been disclaimed.
Int. Cl.[5] H03M 7/00
U.S. Cl. 341—110 **12 Claims**



1. An apparatus adaptable for use with an analog-digital-analog conversion device for effecting communications between an analog device and a digital device, said analog-digital-analog conversion device being operatively connected to said analog device and to the apparatus and converting incoming analog signals received from said analog device into incoming digital signals representative of said incoming analog signals, said analog-digital-analog conversion device also converting interpolated digital signals received from the apparatus into outgoing analog signals representative of said interpolated digital signals and being provided to said analog device, the apparatus comprising:

a decimator-interpolator means for decimating incoming digital signals provided by said analog-digital-analog conversion device and providing decimated incoming digital signals representative of said incoming signals to said digital device, and for interpolating outgoing digital signals received from said digital device and providing interpolated digital signals to said analog-digital-analog conversion device;

said decimator-interpolator means comprising a first decimator-interpolator module, and an output means for providing digital outputs, said first decimator-interpolator module comprising a digital input circuit, a first digital cell circuit, and a second digital cell circuit;

said digital input circuit selectively receiving said incoming digital signal from said analog-digital-analog conversion device and producing an incoming clocked input to said first digital cell circuit, or receiving said outgoing digital signal from said digital device and producing an outgoing clocked input to said first digital cell circuit;

said first digital cell circuit selectively producing a first

iteration decimated digital signal to said second digital cell circuit in response to reception of said incoming clocked digital signal, or producing a first iteration interpolated digital signal to said second digital cell circuit in response to reception of said outgoing clocked input;

said second digital cell circuit selectively producing a second iteration decimated digital signal in response to reception of said first iteration decimated digital signal, or producing a second iteration interpolated digital signal in response to reception of said first iteration interpolated digital signal;

the products of said second digital cell circuit being the outputs of said first decimator-interpolator module; said second digital cell circuit being operatively connected to provide its respective outputs to said output means;

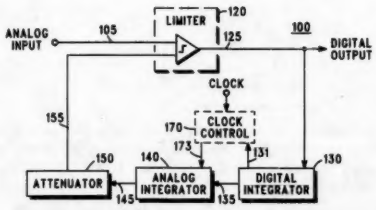
said output means selectively providing said interpolated digital signal to said analog-digital-analog conversion device or providing said decimated incoming digital signal to said digital device.

4,996,529

AUTO-ZEROING CIRCUIT FOR OFFSET CANCELLATION

Lawrence E. Connell, Naperville, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 10, 1989, Ser. No. 335,628
Int. Cl.[5] H03M 1/06
U.S. Cl. 341—118 **36 Claims**



1. A means for biasing an amplifier having an analog input signal, an amplified output signal, and a bias control port for adjusting the DC bias of the output signal, said biasing means comprising:

first means for integrating said amplified output signal, and for producing a first control signal indicative of the time when the integrated output signal exceeds a predetermined positive or negative threshold, and for producing a second control signal indicative of the polarity of the threshold exceeded;

second means for integrating said second control signal in response to said first control signal, thereby providing a third control signal; and

means for coupling said third control signal to said bias control port.

4,996,530

STATISTICALLY BASED CONTINUOUS AUTOCALIBRATION METHOD AND APPARATUS

Howard E. Hilton, Snohomish, Wash., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 27, 1989, Ser. No. 442,379
Int. Cl.[5] H03M 1/08
U.S. Cl. 341—120 **26 Claims**

1. In a subranging analog-to-digital converter that includes:

first and second analog-to-digital converters (ADCs);

a digital-to-analog converter (DAC);

each of said converters having an input and an output;

an analog subtraction circuit having first and second inputs and a difference output;

an analog signal input connected to the first input of the subtraction circuit;

said first ADC having its input connected to the analog signal input and having its output connected to the input of the DAC;

said DAC having its output connected to the second input of the subtraction circuit;

said second ADC having its input connected to the difference output of the subtraction circuit; and

means for combining the outputs of the first and second ADCs to provide a digital output signal;

an improvement wherein the DAC comprises:

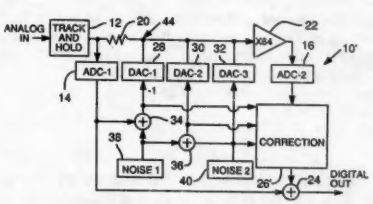
first, second and third DACs, each having an input and an output;

first and second digital noise sources, each having an output;

first and second adders, each having two inputs and an output; and

a correction circuit having a plurality of inputs and an output;

said first adder having its first input coupled to the output of the first noise source and having its second input coupled



to the output of the first ADC, said adder having its output coupled to the input of the first DAC to provide the negated sum of the first noise source output and the first ADC output thereto;

said second adder having its first input coupled to the output of the first noise source and having its second input coupled to the output of the second noise source, said adder having its output coupled to the input of the second DAC to provide the sum of the first and second noise source outputs thereto;

said third DAC having its input coupled to the output of the second noise source for receiving a negated noise output therefrom;

said first, second and third DACs having their outputs coupled to the second input of the analog subtraction circuit;

said correction circuit having a first input coupled to the output of the second ADC, a second input coupled to the output of the first adder, a third input coupled to the output of the second adder, and a fourth input coupled to the output of the second noise source; said circuit including means for compensating the digital output signal for conversion errors in the first, second and third DACs.

4,996,531

DIGITAL OPTICAL CONVERSION MODULE

Dale K. Kotter, North Shelley, and Richard A. Rankin, Ammon, both of Id., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

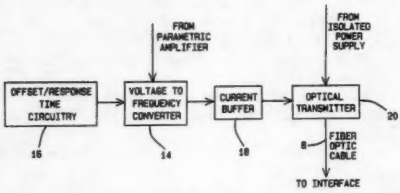
Filed Jul. 19, 1988, Ser. No. 221,394
Int. Cl.[5] H03M 1/60
U.S. Cl. 341—157 **14 Claims**

1. An apparatus for providing high resolution linkage of an analog output device to a digital computer system comprised of:

a voltage-to-frequency converter coupled to the analog output device, said voltage-to-frequency converter capable of producing a train of pulse signals whose frequency is directly related to the analog output of the analog out-

put device, response time circuitry means connected to said voltage-to-frequency converter to offset the output of said voltage-to-frequency converter to a midrange frequency, means for eliminating the loading effects on said output of the voltage-to-frequency converter where said eliminating means is coupled to said voltage-to-frequency converter.

an optical transmitter means connected to said eliminating



means where said optical transmitter means is capable of converting the signal from said voltage-to-frequency converter to an optical signal,

means for sending said optical signal to an optical interface where said optical interface is capable of converting said optical signal to an electrical signal compatible with the digital computer system, and

means for sending said electrical signal to the digital computer system.

4,996,532

DIGITAL BEAM FORMING RADAR SYSTEM

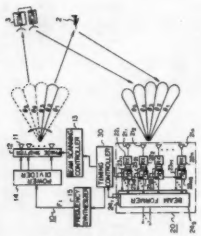
Tetsuo Kirimoto; Takahiko Fujisaka, and Yoshimasa Ohashi, all of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 13, 1989, Ser. No. 450,290

Claims priority, application Japan, Dec. 16, 1988, 63-317772

Int. Cl.[5] G01S *7/36, 7/42*

U.S. Cl. 342—81 **17 Claims**



1. A radar system having improved interference resistant characteristics comprising:

an oscillation means capable of generating a plurality of different frequencies;

a transmitting antenna means connected to said oscillation means for transmitting an electric wave generating one of the frequencies in different directions in a predetermined sequence to allow a desired area to be scanned;

a control means for causing said oscillation means and said transmitting antenna means to be operated in any one, or a combination of, at least three transmission modes including a first transmission mode in which the operation timing of said oscillation means and said transmitting antenna means is synchronized and said transmission frequency is changed every time one scanning operation is completed, a second transmission mode in which the transmission frequency is changed in a predetermined order every time the transmission direction is changed during the respective scanning period and a third transmission mode in which the transmission frequency is changed at random every time the transmission direction is changed during the respective scanning period; and

a receiving means capable of simultaneously forming a plurality of reception beams within the scanning range and converting received signals to corresponding digital signals to output signals indicating the directions and frequencies of the received signals, whereby the transmission mode may be changed depending on the directions and the frequencies of the incoming signals.

4,996,533

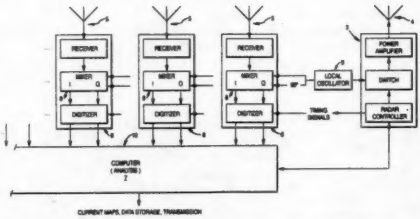
SINGLE STATION RADAR OCEAN SURFACE CURRENT MAPPER

Peter T. May, Longmont; Richard G. Strauch, and Bob L. Weber, both of Boulder, all of Colo., assignors to Univ. of Colo. Foundation, Inc., Boulder, Colo. and The United States of America as represented by the Secretary of the Commerce, Washington, D.C.

Filed Sep. 15, 1989, Ser. No. 408,007

Int. Cl.[5] G01S *13/58, 13/00;* **B21B** *21/00*

U.S. Cl. 342—108 **3 Claims**



1. A method for measurement of ocean currents using a single radar scanning the ocean surface with a directional beam and using spatially separated antenna arrays, comprising the steps of

calculating the spectrum for each range and antenna,

forming beams by summing spectra including phase offsets for beam steering,

calculating radial velocity using the spectral offset of the first order Bragg lines,

calculating correlation functions using fast Fourier transforms of mean power spectrum and cross-spectrum,

calculating transverse current components from parameters τ' and τ_x on correlation functions, where T' is the position of the maximum of the cross-correlation function, and T_x is the lag such that the auto-correlation function falls to the maximum value of cross-correlation, and

combining the observations of the radial and transverse current components at all ranges and directions to generate current maps.

4,996,534

PROCESSING OF CONCATENATED RADAR MEASUREMENTS TO RE-ESTABLISH SIGNAL PHASE COHERENCE

Robert A. Grubbs, Riverside, Calif., and Gregory P. Brown, Celeste, Tex., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 21, 1989, Ser. No. 456,017

Int. Cl.[5] G01S *7/30*

U.S. Cl. 342—195 **16 Claims**

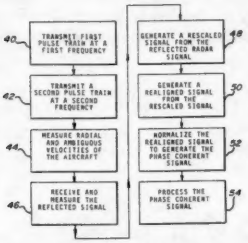
1. A method of signal processing for re-establishing frequency, phase and amplitude coherence for radar samples generated by multiple frequency transmitter pulses directed towards, modulated by and reflected from airborne objects having radial and ambiguous velocities wherein said multiple frequency transmitter pulses radiate from an antenna array

rotating at a constant rate and wherein the phase, amplitude scale and frequency of said reflected radar samples received at said antenna array are compared with a given reference phase, amplitude scale and frequency, said method comprising the steps of:

(a) generating a first pulse train at a first transmitter frequency for transmitting said first pulse train towards said airborne object;

(b) generating a second pulse train at a second transmitter frequency for transmitting said second pulse train towards said airborne object;

(c) measuring the radial velocity of said airborne object;


40
TRANSMIT FIRST PULSE TRAIN AT A FIRST FREQUENCY
42
TRANSMIT A SECOND PULSE TRAIN AT A SECOND FREQUENCY
44
MEASURE RADIAL AND AMBIGUOUS VELOCITIES OF THE AIRCRAFT
46
RECEIVE AND MEASURE THE REFLECTED SIGNAL
48
GENERATE A RESCALED SIGNAL FROM THE REFLECTED RADAR SIGNAL
50
GENERATE A REALIGNED SIGNAL FROM THE RESCALED SIGNAL
52
NORMALIZE THE REALIGNED SIGNAL TO GENERATE THE PHASE COHERENT SIGNAL
54
PROCESS THE PHASE COHERENT SIGNAL

(d) receiving and measuring said reflected radar samples resulting from said first pulse train at said first transmitter frequency and said second pulse train at said second transmitter frequency;

(e) rescaling said reflected radar samples to said given reference frequency for generating a rescaled signal;

(f) realigning said rescaled signal to said given reference phase for generating a realigned signal;

(g) normalizing said realigned signal to said given reference amplitude scale for generating a phase coherent signal; and

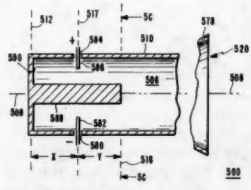
(h) processing said phase coherent signal for identifying said reflected radar samples.

4,996,535

SHORTENED DUAL-MODE HORN ANTENNA

Charles E. Profera, Jr., Cherry Hill, N.J., assignor to General Electric Company, East Windsor, N.J.

Filed Sep. 8, 1988, Ser. No. 241,671
Int. Cl.[5] H01Q *13/00*
U.S. Cl. 343—786 **7 Claims**



1. A horn antenna arrangement, comprising:

a hollow waveguide including a conductive peripheral wall arrangement centered on a longitudinal axis;

a conductive short circuiting plate connected to said peripheral wall arrangement at a first plane transverse to said axis;

an elongated conductor connected at one end to said short circuiting plate and extending within said waveguide and centered on said axis to an abrupt termination at a second plane transverse to said axis, said elongated conductor being electrically isolated from said conductive peripheral wall arrangement at transverse planes other than said first plane;

push-pull feed means coupled to said hollow waveguide at a third transverse plane lying between said first and second transverse planes, for transducing a signal with said waveguide with first and second antiphase electric poles at diametrically opposite sides of said axis; and

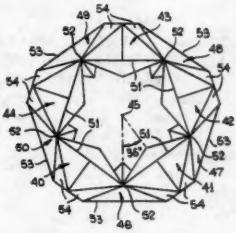
a radiation aperture centered on said axis and defined at an extension of said hollow waveguide said radiation aperture being separated by a predetermined distance from said second plane which is selected to provide a phase difference of 180° between a fundamental waveguide mode and a higher-order waveguide mode at said radiating aperture for tending to equalize the radiation patterns in two orthogonal planes.

4,996,536

RADAR REFLECTORS

Jeffrey C. Broadhurst, Branston, England, assignor to Woodville Polymer Engineering Limited, Ross-en-Wye, England

PCT No. PCT/GB89/00137, § 371 Date Oct. 19, 1989, § 102(e) Date Oct. 19, 1989, PCT Pub. No. WO89/07840, PCT Pub. Date Aug. 24, 1989
PCT Filed Feb. 16, 1989, Ser. No. 424,235
Claims priority, application United Kingdom, Feb. 19, 1988, 8803871; Aug. 15, 1988, 8819356.0
Int. Cl.[5] H01Q *15/20*
U.S. Cl. 343—912 **14 Claims**



1. An array of reflectors of electromagnetic waves comprising a plurality of trihedral reflectors each comprising three radar reflective panels with right-angled corners meeting at a vertex and each panel meeting the other two panels along two sides leaving a third side defining a triangular opening with a major axis detected outwards from said vertex through said opening and defined by the intersection of planes normal to and bisecting said panels, said plurality of trihedral reflectors being arranged about a vertical axis with said major axis of each reflector directed outwards and upwardly away from said vertical axis and with a said third side of alternate reflectors disposed uppermost and arranged horizontally and a said third side of intermediate alternate reflectors disposed lowermost and arranged horizontally, and additional radar reflective panels each disposed between the triangular openings of adjacent reflectors and bridging between adjacent downwardly diverging said third sides of panels of said reflectors.

4,996,537

METHOD OF AND APPARATUS FOR RECORDING IMAGE

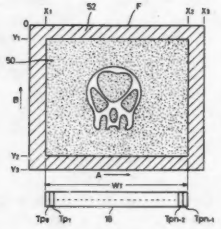
Kazutomo Kishimi, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 28, 1989, Ser. No. 399,060
Claims priority, application Japan, Aug. 31, 1988, 63-219554
Int. Cl.[5] G01D *15/10*; G03C *5/16*
U.S. Cl. 346—1.1 **6 Claims**

3. An apparatus for recording an image on a heat sensitive recording material, said image having a high density level of dark portions therein, said recording material comprising a

support coated with a coating solution which makes an unheated area colored and a heated area transparent in a colorless or light colored manner, said apparatus comprising:

negative-positive reversal means for processing input image data through negative-positive reversal, wherein a majority of said input image data corresponds to dark image areas



a thermal head having a plurality of heating elements energizable by the processed image data for recording an image on the heat sensitive recording material held against the thermal head based on said processed image data, wherein said majority of image data corresponding to dark areas in said image is processed so that little or no heat energy is produced by said thermal head when said majority of image data is applied thereto.

4,996,538

APPARATUS FOR SEPARATING AND RECOVERING SOLID DEVELOPER PARTICLES TRANSPORTED BY A GASEOUS FLOW

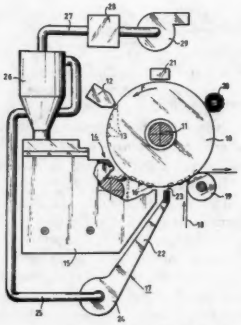
André Brecy, Hericourt, and Philippe Poinsot, Belfort, both of France, assignors to Bull S.A., Paris, France

Filed Nov. 28, 1989, Ser. No. 442,201

Claims priority, application France, Nov. 29, 1988, 88 15595

Int. Cl.[5] G11B *9/00*

U.S. Cl. 346—74.3 **19 Claims**



1. An apparatus for separating and recovering solid developer particles transported by a gaseous flow comprising:

a separation chamber (40) having an axis of revolution (45) disposed substantially vertically, the chamber having in its upper portion an admission conduit (43) for admitting gas into the chamber (40) and arranged so as to create a turbulent flow for a gaseous flow, laden with solid developer particles, and an escape conduit (44) disposed axially of the chamber to enable the evacuation of the gaseous flow, from which the particles have been removed, the chamber further including, in its lower portion, an outlet opening (46) communicating with a discharge conduit (47) having a section smaller than that of the separation chamber, said conduit being closed at its lower end by a movable shutter (49) to provide a box for recovery of particles, the chamber being arranged such that the developer particles, after being separated from the gaseous flow int he chamber, are urged by gravity toward the discharge conduit and into the box;

and a helical device (52) disposed in the discharge conduit (47) and in proximity with the outlet opening (46), the helical device having a surface the helical edge (53) of which is in contact with the internal wall of the discharge conduit, and the inclination of which with respect tot he horizontal has a value between 3° and 10° and is oriented in the same direction as that of the helical path of the solid particles to be transported by the gaseous flow, to prevent particles arriving in the recovery box from being re-aspirated by the rising gaseous flow which circulates above said helical device and finally escapes via the escape conduit.

4,996,539

LABEL PRINTER

Koichi Haraga, Numazu; Kazuhide Takahama, Shizuoka, and Mitsuo Uchimura, Numazu, all of Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan

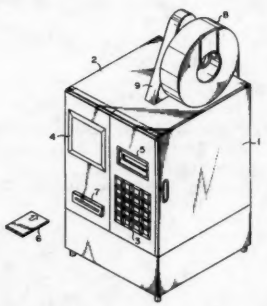
Continuation of Ser. No. 211,423, Jun. 24, 1988, abandoned.

This application Jan. 16, 1990, Ser. No. 465,517

Claims priority, application Japan, Jun. 30, 1987, 62-161058

Int. Cl.[5] G01D *15/10*; B41J *45/00*; G06K *7/10*

U.S. Cl. 346—76 PH **7 Claims**



1. A label printer comprising:

input means for inputting printing data;

a built-in memory including at least one standard printing format stored therein;

an inlet port for receiving memory cards each of which includes at least one optional printing format stored therein, said memory cards being selectively and detachably connectable to said inlet port;

printing means for printing the printing data input from the input means on a label; and

control means including means for selecting one of the printing formats stored in the built-in memory and a received memory card, means for driving the printing means to print the input printing data in the selected printing format, and means for inhibiting an optional printing format from being selected by said selecting means when it is detected that no memory card is received in and connected to said inlet port.

4,996,540

RECORDER WITH LIGAMENT SUPPORTED SCAN MIRROR AND RESILIENT OPTICAL SYSTEM SUPPORT

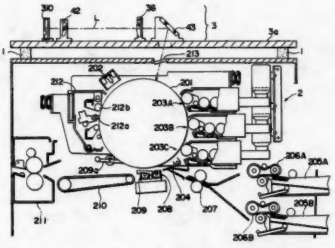
Toshihiro Motoi; Toshihiko Nakazawa; Toshihiro Takesue; Satoshi Takahashi, and Takashi Murahashi, all of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Jan. 24, 1989, Ser. No. 301,242

Claims priority, application Japan, Jan. 29, 1988, 63-20225; Mar. 31, 1988, 63-79907

Int. Cl.[5] H04N *1/21;* G02B *26/08*

U.S. Cl. 346—108 4 Claims



1. In an image recording apparatus comprising an image forming portion including an image retainer, and a beam scanning optical system including a deflector having a deflecting member with a frame, a reflecting mirror, a drive coil and ligaments molded into one piece, the improvement wherein a resilient member is interposed between said optical system and said image forming portion, said resilient member having the characteristic of

$$i<2.8\% \text{ and } i=\{1/(f/fn)^2-1\}\times 100\%$$

wherein i is the theoretical value of oscillation transmissibility of said resilient member, fn is the intrinsic frequency (Hz) of said optical system including said resilient member, and f is the oscillation frequency (Hz) of said image forming portion.

4,996,541

FILM CONVEYING APPARATUS

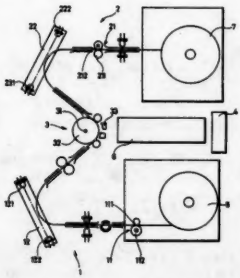
Shinichi Mori; Akiyoshi Hamada; Mitsutoshi Yagoto, and Masanori Murakami, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 18, 1990, Ser. No. 510,577

Claims priority, application Japan, Apr. 19, 1989, 1-99665; Apr. 19, 1989, 1-99666

Int. Cl.[5] G01D *15/14;* B41J *2/47*

U.S. Cl. 346—108 15 Claims



1. A film conveying apparatus, comprising:

film feeding means for feeding a film;

film drawing means for drawing said fed film;

slack detecting means including a light emitting element and a light receiving element for optically detecting slack of said film formed between said film feeding means and said film drawing means; and

controlling means for stopping, when said slack detecting means detects slack of said film, emission of light from said light emitting element for a prescribed time period.

4,996,542

APPARATUS FOR SCANNING SHEET-SHAPED RECORDING MEDIUM BETWEEN EDGE ROLLERS

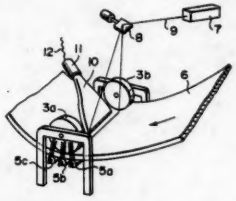
Makoto Ohgoda, and Kaoru Tamura, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 34,954, Apr. 6, 1987, abandoned, which is a division of Ser. No. 673,443, Nov. 20, 1984, Pat. No. 4,712,009. This application Sep. 6, 1989, Ser. No. 402,995

Claims priority, application Japan, Nov. 21, 1983, 68-219312

Int. Cl.[5] G01D *15/16*

U.S. Cl. 346—108 5 Claims



1. An apparatus for scanning a sheet-shaped recording medium (6), the apparatus comprising:

(i) a conveyance means comprising a conveying roller and a plurality of nip rollers (*5a*, *5b*, *5c*) for forming nips for conveying the sheet-shaped recording medium in a conveyance direction in cooperation with said conveying roller by contacting the surface of said conveying roller, and

(ii) a scanning optical system for scanning the sheet-shaped recording medium, which is conveyed by said conveyance means, by a light beam in a scanning direction approximately normal to the conveyance direction of the sheet-shaped recording medium,

(iii) said conveying roller being fabricated as a pair of edge rollers (*3a*, *3b*), said edge rollers having opposing faces int eh scanning direction, and said edge rollers contacting said nip rollers only near both end portions of said nip rollers such that the sheet-shaped recording medium is bent to fit a circumferential surface of each of said edge rollers to thereby form a bent portion,

(iv) said scanning optical system being positioned on the same side of the sheet-shaped recording medium as said edge rollers for scanning the sheet-shaped medium along said bent portion between the opposing faces of said pair of edge rollers.

4,996,543

PRECISION MEDIUM HANDLING SYSTEM AND METHOD FOR A RECORDER

Michel Moulin, and Marcello Baseggio, both of c/o Versitec S.A., Avenue des Baumettes 17, CH-1020 Renens, Switzerland

Filed Jan. 5, 1990, Ser. No. 461,345

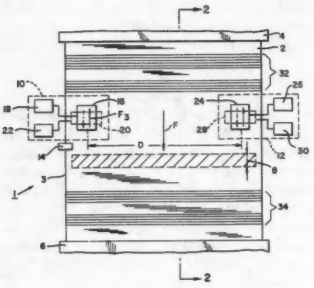
Claims priority, application United Kingdom, Feb. 10, 1989, 8903051

Int. Cl.[5] B41B *19/00*

U.S. Cl. 354—5 39 Claims

1. A precision transport system for accurately moving a photosensitive medium, said system comprising, in combination, drive means for moving said photosensitive medium in a predetermined alignment relative to a first reference line, detection means for detecting the position of a second reference

line on said medium and producing corresponding electrical signals, and correction means responsive to said electrical



signal for correcting the direction of travel of said medium relative to said first reference line.

4,996,544

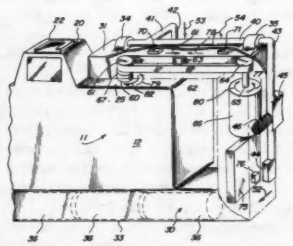
AUTOWINDER FOR UNDERWATER AND ALL WEATHER CAMERA

John H. Fiorda, 3074 Van Buren Ave., Costa Mesa, Calif. 92626

Filed Jan. 11, 1990, Ser. No. 463,520

Int. Cl.[5] G03B *1/18*

U.S. Cl. 354—64 **10 Claims**



1. For use in combination with a camera having a film advance mechanism and shutter release, an autowinder comprising:

a sealed housing having an interior cavity and an exterior;

a trigger arm pivotally coupled to said housing exterior having a first end capable of being positioned proximate the shutter release of the camera and a second end;

a magnet secured to said second end;

a bidirectional motor within said housing;

circuit means within said housing operatively coupled to said motor having first magnetic sensing means responsive to said magnet to initiate energizing of said motor in a first direction;

drive means for coupling said motor to the film advance mechanism of the camera; and

limit means cooperating with said circuit means and said drive means to cause operation of the film advance mechanism of the camera through a winding cycle once motor operation is initiated.

4,996,545

APPARATUS FOR CORRECTING BLURRED IMAGE OF CAMERA USING ANGULAR ACCELERATION SENSOR AND ANGULAR ACCELERATION SENSOR

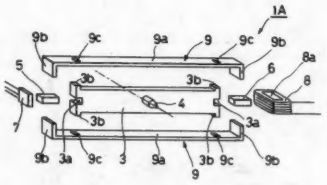
Shigeo Enomoto, and Taminori Odano, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 30, 1990, Ser. No. 501,885

Claims priority, application Japan, Apr. 3, 1989, 1-84318; Jan. 19, 1990, 2-3623[U]

Int. Cl.[5] G03B *39/00;* **G01P** *15/08*

U.S. Cl. 354—70 **21 Claims**



1. An apparatus for correcting a blurred image comprising:

a blurred image correcting lens which constitutes at least a part of a photographing lens of a camera and which is supported so as to move in a direction substantially perpendicular to the optical axis of the photographing lens;

a driver for driving the correcting lens;

an angular acceleration sensor adapted to detect the angular acceleration applied to said camera to send a drive signal to said driver to cancel movement of the optical axis of the photographing lens;

said angular acceleration sensor comprising a rotatable sensor arm having a rotational shaft centrally positioned along the length of said sensor arm and permanent magnets at the opposite ends of said sensor arm, a magnetic sensor which is mounted opposite one of said permanent magnets, a coil which is mounted opposite to the other said permanent magnet, said coil comprising a winding intersecting the magnetic flux of said other permanent magnet;

whereby the blurred image correcting lens is driven in accordance with the output of said coil.

10. An angular acceleration sensor comprising a rotatable sensor arm having a rotational shaft centrally positioned along the length of said sensor arm and permanent magnets at the opposite ends of said sensor arm, a magnetic sensor which is opposite one of said permanent magnets, and a coil which is opposite the other of said permanent magnets and comprising a winding intersecting the magnetic flux of the other said permanent magnet.

4,996,546

CAMERA APPARATUS FOR MAGNETICALLY RECORDING ON FILM

Daniel M. Pagano, Henrietta, and Robert P. Cloutier, Spencerport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 420,657, Oct. 11, 1989, abandoned, which is a continuation of Ser. No. 254,908, Oct. 7, 1988, abandoned. This application Jun. 20, 1990, Ser. No. 541,177

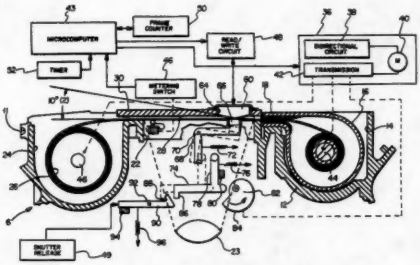
Int. Cl.[5] G03B *17/24*

U.S. Cl. 354—76 **18 Claims**

1. A photographic still camera for transporting a photographic film over an exposure opening to expose frames of the film, the film having a magnetic surface on one side for magnetically recording information on the film, said camera comprising:

a camera body having an exposure opening;

a film platen supported to engage the film and retain it in an exposure plane adjacent said opening; and



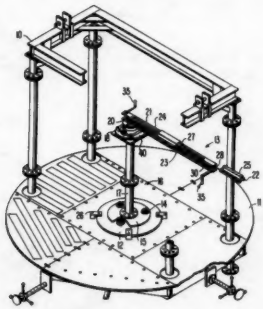
a magnetic head mounted at said platen to engage the magnetic surface of said film in said plane.

4,996,547

RADIAL ARM STRIKE RAIL

Mark H. McKeown, Golden, and Steven C. Beason, Lakewood, both of Colo., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Aug. 31, 1989, Ser. No. 401,390
Int. Cl.[5] G03B *29/00*
U.S. Cl. 354—81 **2 Claims**



1. Apparatus for aligning a geologic bearing or direction measuring device to a target point comprising:

a shaft mapping platform having a lower pedestal attached to a level adjusting plate adapted to be centered and leveled,

an upper pedestal mounted on said lower pedestal,

a rotary indexing table mounted on said upper pedestal,

a strike rail mounted on said rotary indexing table, said strike rail having a first pulley and crank mounted on a first end, a second pulley and crank mounted on a second end, and an indicating scale located on a top surface,

an extension arm adapted to be slidably movable from a center position along said strike rail to an outer position,

a cog belt mounted on said adapted to be driven by said first and second pulleys, said cot belt being fastened to said extension arm and adapted to move said extension arm,

a scale affixed to an outer surface of said cog belt; and

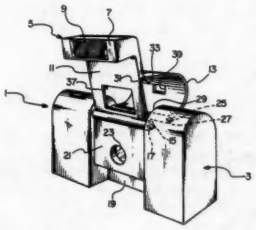
a pointer mounted vertically on said second end of said strike rail and adapted to indicate radial distance of horizontal movement of said scale and said extension arm.

4,996,548

CAMERA WITH FLIP-UP FLASH UNIT

Joseph J. Schappler; David J. Glogan, both of Rochester, and William L. Burnham, Leroy, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 12, 1990, Ser. No. 478,910
Int. Cl.[5] G03B *15/03, 13/04*
U.S. Cl. 354—149.11 **11 Claims**



1. A photographic camera comprising (a) a camera housing and (b) a flip-up flash unit including a head part having a flash emission window and at least one supporting part for said head part pivotally connected to said camera housing to permit swinging movement of said flash unit to a folded storage position in which the head part and said supporting part cover respective portions of the camera housing and to a non-folded operative position in which the head part and the supporting part are elevated from the camera housing with said flash emission window substantially facing a subject to be photographed, is characterized in that:

said supporting part of said flash unit has a viewfinder opening for viewing a subject to be photographed through said viewfinder opening when the flash unit is in the non-folded position; and

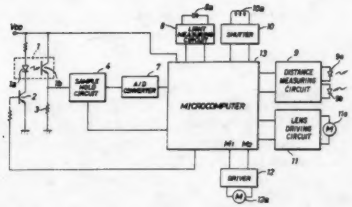
a cover part is connected to said camera housing separately from said flash unit to permit movement of said cover part to completely cover said viewfinder opening when the flash unit is in the folded position.

4,996,549

FILM FEEDING CONTROL DEVICE FOR CAMERA

Kohichi Yamaguchi, Hachioji, Japan, assignor to Konica Corporation, Tokyo, Japan

Filed Sep. 12, 1989, Ser. No. 406,067
Claims priority, application Japan, Sep. 13, 1988, 63-227465
Int. Cl.[5] G03B *1/18, 17/36*
U.S. Cl. 354—173.11 **3 Claims**



1. A film feeding control device for a camera in which film perforations are arranged so as to pass through a detecting section of a photointerrupter during film feeding, which detects presence of perforations by comparing an output signal from the photointerrupter when the perforations pass through the detecting section with a predetermined threshold limit value and which detects film feeding conditions according to

the variation of the output signal, characterized in that said device comprises:

calculating means for calculating an average value from maximum and minimum values of the output signal from said photointerrupter;

judging means for establishing said average value as the threshold limit value and for discriminating the film feeding condition by comparing the output signal from said photointerrupter with said threshold limit value; and

controlling means for controlling the feed of film according to the judged result by said judging means.

4,996,550

SHUTTER SPEED CONTROL DEVICE

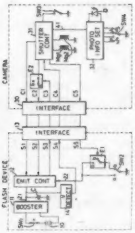
Hideki Matsui, Yokohama; Nobuyoshi Hagiuda, Kawasaki; Norikazu Yokonuma, Tokyo; Hiroshi Sakamoto, Kawasaki, and Yoshikazu Iida, Chigasaki, all of Japan, assignors to Nikon Corporation, Tokyo, Japan

Filed Apr. 3, 1989, Ser. No. 332,179

Claims priority, application Japan, Apr. 8, 1988, 63-86387

Int. Cl.[5] G03B *7/00, 15/03*

U.S. Cl. 354—420 **7 Claims**



1. A camera system capable of flash photography, comprising:

shutter means for opening and closing an exposure opening to thereby start and terminate the exposure of a film;

means for generating a synchronizing signal for triggering light emission for said flash photography, said generating means having a first synchro control mode in which said synchronizing signal is generated when said exposure is started, and a second synchro control mode in which said synchronizing signal is generated when said exposure has begun termination;

means for arbitrarily selecting a control mode from said first synchro control mode and said second synchro control mode; and

shutter control means for making possible the driving of said shutter means at shutter speeds up to a first limit speed as long as said first synchro control mode is selected, and making possible the driving of said shutter means at shutter speeds up to a second limit speed as long as said second synchro control mode is selected, said second limit speed being lower than said first limit speed.

4,996,551

EXPOSURE CONTROL APPARATUS

Masaharu Kanai, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 20, 1990, Ser. No. 486,875

Claims priority, application Japan, Feb. 29, 1989, 1-39605; Feb. 20, 1989, 1-39606

Int. Cl.[5] G03B *7/08*

U.S. Cl. 354—432 **10 Claims**

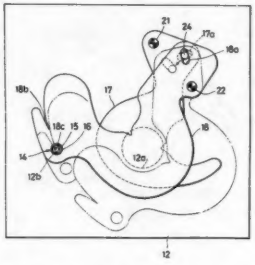
1. An exposure control apparatus for controlling the opening and closing of a shutter blade, comprising:

first photometry means for measuring a plurality of divisional areas of a field of views when said shutter blade is closed;

calculating means for calculating the correct exposure time for a central area of said field of view by using a plurality of signals obtained by measuring said plurality of areas with said first photometry means;

second photometry means for measuring light from said field of view;

a light-receiving aperture formed in said shutter blade, said light-receiving aperture progressively opening said second photometry means upon progressive opening of said shutter blade;



integrating means for integrating an output signal from said second photometry means; and

means for outputting a signal to close said shutter blade when the value integrated by said integrating means reaches a value corresponding to said correct exposure time.

4,996,552

IMAGE EXPOSURE DEVICE FOR EXPOSING PHOTOSENSITIVE RECORDING MEDIUM TO COLOR IMAGE LIGHTS

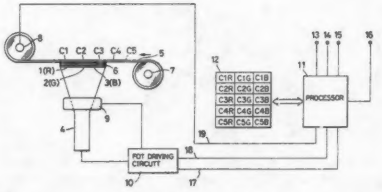
Kazuo Sangyoji, Nagoya, and Hiroshi Kawahara, Aichi, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Apr. 9, 1990, Ser. No. 506,467

Claims priority, application Japan, Apr. 7, 1989, 1-89485

Int. Cl.[5] G03B *27/00*

U.S. Cl. 355—1 **6 Claims**



1. An exposure device used in an image forming apparatus for exposing a photosensitive recording medium carrying microcapsules on one surface thereof to color image lights produced in accordance with color image data representing an original image to form a latent image corresponding to the original image, comprising:

exposing means having plural exposing surfaces for producing the color image lights in accordance with the color image data and selectively exposing the photosensitive recording medium to the color image lights to form the latent image on the photosensitive recording medium, said exposing surfaces being disposed in such a manner as to confront the other surface of the photosensitive recording medium; and

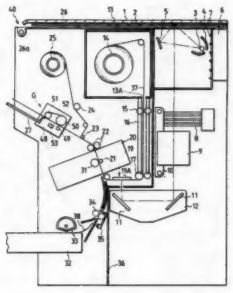
control means for driving and controlling said exposing means to produce the color image lights in accordance with the image data inputted thereto and expose the color image lights to the photosensitive recording medium.

4,996,553

METHOD FOR PRODUCING GLOSS IMAGE ON IMAGE RECORDING MEDIUM AND APPARATUS FOR MAKING THE GLOSS IMAGE ON THE MEDIUM

Osamu Takagi, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Filed Aug. 28, 1989, Ser. No. 398,979
Claims priority, application Japan, Aug. 31, 1988, 63-217486
Int. Cl.[5] G03B 27/32, 27/52
U.S. Cl. 355—27 8 Claims



1. A method for forming a glossy output image on an image recording medium, the image recording medium having one surface carrying an output image, the method comprising the steps of:

heating and pressing the image recording medium by means of a pressure contact member for meltingly smoothening the one surface of the image recording medium;

cooling the one surface during travel of the image recording medium while maintaining a surface contact between the pressure contact member and the image recording medium; and

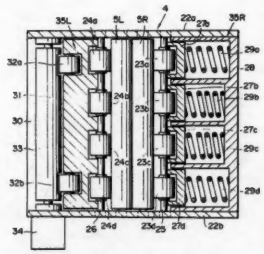
separating the image recording medium from the pressure contact member.

4,996,554

PRESSURE DEVELOPING DEVICE

Hayakawa Kiyoharu, Ama, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Jun. 20, 1989, Ser. No. 369,044
Claims priority, application Japan, Jun. 21, 1988, 63-82195[U]; Jul. 5, 1988, 63-89764[U]
Int. Cl.[5] G03B 27/32
U.S. Cl. 355—27 2 Claims



1. A pressure developing device having a pair of pressure rollers being adapted to be brought into and out of contact with each other for pressurizing an exposed recording sheet containing a plurality of photo-sensitive microcapsules each containing a component to change the rupture strength thereof when exposed to light and a developing sheet coated with a developer material to develop a visible image thereon in an overlapped state, said pressure developing device further comprising:

a plurality of elastic spring members arranged along one of said pair of rollers from edge to edge for generating a push force, said elastic spring members being arranged in such a manner that the push force of the elastic spring members located at a central portion of said one of said pair of pressure rollers is stronger than that of the elastic spring members located at said edges; and

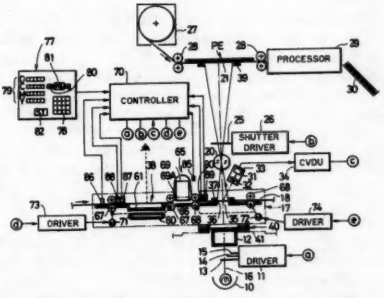
a plurality of backup rollers for respectively transmitting the push force generated by each of said elastic spring members to said one of said pair of rollers.

4,996,555

OPTICAL SYSTEM FOR USE WITH A VIEWFINDER

Satoru Takemoto; Rokusaburo Kaneko; Matsuyuki Miwa, and Seiji Makino, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 12, 1990, Ser. No. 464,063
Claims priority, application Japan, Jan. 13, 1989, 1-6757; Jun. 9, 1989, 1-147165; Nov. 22, 1989, 1-304486
Int. Cl.[5] G03B 13/24
U.S. Cl. 355—44 20 Claims



1. A photographic film carrier attached to a photographic printer for defining a film exposing window in which frames of a negative film are placed to expose each frame to create a latent image on a photographic paper, said photographic film carrier comprising:

a film viewing window, formed close to said film exposing window in said photographic film carrier, for allowing an operator to inspect each said frame positioned therein for exposure; and

looping means, disposed between said film viewing window and film exposing window, for forming a loop in said negative film between said film viewing window and said film exposing window, said looping means comprising:

a guide plate;

a pair of rollers, disposed adjacent to each of said film viewing window and film exposing window, for forming a loop in said negative film above said guide plate;

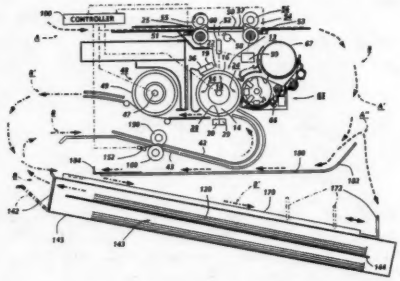
a movable guide plate, disposed on said guide plate, for guiding a leading end of said negative film to said pair of rollers provided in association with said film viewing window, said movable guide plate then being swung up for forming a space above said guide plate wherein a loop is formed; and

control means for controlling rotation of said pairs of rollers provided in association with said film viewing window and film exposing window.

4,996,556
LARGE DOCUMENT COPYING SYSTEM

Gerald A. Gray, Jr., Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 3, 1989, Ser. No. 389,094
Int. Cl.[5] G03B *27/50*
U.S. Cl. 355—50 **8 Claims**



1. A system for copying large documents on a large document copier having a large document sheet feeder and a large copy sheet or web feeder with improved convenience and efficiency comprising the steps of:

inserting the leading edge of said large document into said document feeder from the front of said large document copier,

automatically initially feeding said large document away from the front of said large document copier with said large document feeder,

pausing said feeding of said large document by said large document feeder in a position wherein a trailing portion of said large document is retained by said document feeder and a substantial portion of said large document is removed from the front of said large document copier so that the front of said large document copier is unobstructed by said large document,

inserting a copy sheet or web into said large document copier from the front thereof for copying.

activating said large document copier to copy said large document onto said copy sheet or web after said copy sheet or web has been inserted,

and, in response to said copying activation, first automatically rapidly feeding said large document back in a reverse direction with said large document feeder with out copying, to a position wherein a leading portion of said large document is retained by said document feeder, and then, promptly thereafter, automatically again reversing the direction of feeding said large document with said large document feeder and moving said large document away from the front of said large document copier at a copying speed synchronized with movement of said copy sheet or web for copying said large document onto said copy sheet or web.

4,996,557
JAM DETECTING AND DISPLAYING DEVICE IN AN IMAGE RECORDING APPARATUS

Atsushi Takagi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

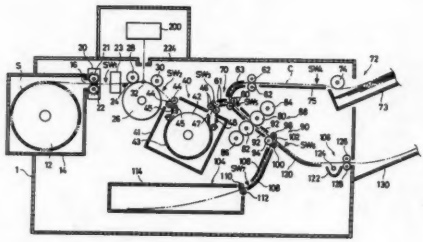
Division of Ser. No. 181,353, Apr. 14, 1988, Pat. No. 4,908,655. This application Oct. 5, 1989, Ser. No. 417,620
Claims priority, application Japan, Apr. 14, 1987, 62-89824
Int. Cl.[5] G03G *15/00*; B65H *7/06*
U.S. Cl. 355—50 **2 Claims**

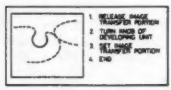
1. A jamming detecting and displaying device in an image recording apparatus, having jamming clearing members including a plurality of knobs and levers, which comprises:

jamming detecting means for detecting the jamming of an image recording material in sa'd image recording apparatus;

jamming displaying means for displaying the position where jamming occurs and information concerning procedures for eliminating said jamming; and

control means responsive to said detecting means for determining a procedure for eliminating said jamming and controlling said jamming displaying means to display



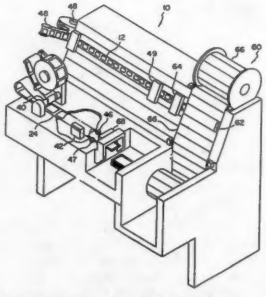


information concerning said procedure, wherein said displaying means displays information concerning said procedure in a manner comprising simultaneously displayed sentences to identify the sequence and combination in which said plurality of knobs and levers should be operated, wherein said displaying means is positioned such that an operator of the image recording apparatus can observe said displaying means when a front door of the image recording apparatus is opened.

4,996,558
COLLATING DEVICE

Kanji Tokuda; Yoshihiko Saeki; Kiichiro Sakamoto, all of Kanagawa, and Fumio Matsumoto, Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 11, 1988, Ser. No. 217,210
Claims priority, application Japan, Jul. 30, 1987, 62-191188; Jul. 30, 1987, 62-191186
Int. Cl.[5] G03B *27/48*
U.S. Cl. 355—50 **14 Claims**



1. In a collating device for collating images on a photographic film with those printed on a printing paper from said

photographic film while conveying said film and said printing paper, an improvement comprising:

a reading device for reading a unique frame number recorded on said film for identifying each frame image; and

a printing device for printing each unique frame number which has been read by said reading device on the printing paper on which has been printed the image of said film which corresponds to that frame number.

4,996,559

OPTICAL SYSTEM SUPPORTING MECHANISM FOR AN IMAGE PROCESSING EQUIPMENT

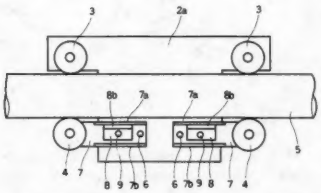
Naoki Sakamoto, Japan, and Itakiyo Masanori, both of Osaka, Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Oct. 24, 1989, Ser. No. 426,739

Claims priority, application Japan, Oct. 28, 1988, 63-141429[U]

Int. Cl.[5] G03G *15/28*

U.S. Cl. 355—56 **1 Claim**



1. An optical system supporting mecahnism of an image processing equipment comprising:

at least two first guide members which move along a guide shaft and pusher rollers which are respectively placed corresponding to the first guide members, with the guide shaft therebetween, said at least two first guide members and said pusher rollers being provided on a moving unit which supports an optical system that can move along the guide shaft,

arms rotatable around a shaft provided at a right angle to an axis of the guide shaft, said arms being provided on the moving unit, corresponding to the pusher rollers,

the pusher rollers being attached to the end portions of the arms, and

the arms being so biased that the pusher rollers are pushed against the guide shaft, and characterized by that:

a slot which is provided at nearly a right angle to the axis of the guide shaft is formed in the arm,

an engaging portion is formed at the edge at the guide shaft side of the arm,

a mounting hole is formed in a plate spring at an edge of the guide shaft side which is brought into contact with the engaging portion of the arm,

the plate spring is elastically pushed toward the moving unit through the arm by means of a screw which passes through the mounting hole of the plate spring and the slot of the arm,

when the screw is loosened, the guide shaft is so composed that it can be put between the first guide members and the pusher rollers by means of the plate spring, and

when the screw is tightened, the guide shaft is integrally tightened in a body between the first guide members and the pusher rollers which are integrally combined as one body by the screw through the moving unit.

4,996,560

APPARATUS FOR EXPOSING AN IMAGE OF AN ORIGINAL FILM ON A PHOTOSENSITIVE MATERIAL IN VACUUM CONTACT WITH THE ORIGINAL FILM, AND METHOD THEREFOR

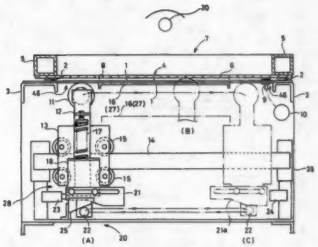
Seiji Nanri; Masatoshi Ueno, and Takashi Ohno, all of Hikone, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Japan

Filed Oct. 31, 1989, Ser. No. 429,813

Claims priority, application Japan, Oct. 31, 1988, 63-276568; Dec. 12, 1988, 63-160449; Jun. 29, 1989, 1-169263

Int. Cl.[5] G03B *27/20, 27/02*

U.S. Cl. 355—91 **18 Claims**



1. A vacuum contact printing apparatus, comprising:

a plate and a flexible sheet;

evacuating means for evacuating air from between said plate and said flexible sheet;

air forcing means for forcing air toward an edge of a composite which is supported between said plate and said flexible sheet, said composite including an original film and photosensitive material, said air forcing means including:

(a) moving means for moving a squeegee toward said edge of said composite while pressing said squeegee against said flexible sheet, and

(b) controlling means for controlling said moving means according to the position of said squeegee with respect to the position of said edge of said composite; and

means for printing an image of said original film on said photosensitive material by supplying light through said plate.

4,996,561

IMAGE FORMING APPARATUS WITH A DOCUMENT IMAGE EDITION FUNCTION

Tsuyoshi Yoshimura, Tokyo, and Takeshi Yamakawa, Fujisawa, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Oct. 3, 1989, Ser. No. 416,484

Claims priority, application Japan, Oct. 5, 1988, 63-130731[U]

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—202 **4 Claims**

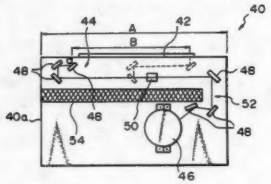
1. An image forming apparatus having an image carrier for carrying a latent image thereon, original document support means, optics for steering an imagewise reflection from an original document to said image carrier to form a latent image, and a body accommodating said image carrier and said optics, said apparatus comprising:

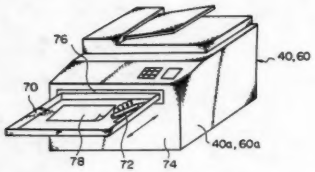
a space defined in said body between the optics and the image carrier and dimensioned sufficiently greater than the maximum original document size applicable to said image forming apparatus;

a housing constituting the body and formed with an opening through a part of said housing; and

an editor supported so as to be insertable into, and removable from, said body via said opening for editing a document image, said editor having a substantially flat rigid surface separated from said original document support

means and sufficiently greater than the maximum original document size, wherein said editor is accommodated in





the space of the body and pulled out of said space through said opening as needed.

4,996,562

CONTROL DEVICE IN IMAGE FORMING APPARATUS

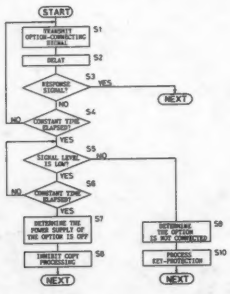
Kazuhiro Mizude, Osaka, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan

Filed Jan. 8, 1990, Ser. No. 461,748

Claims priority, application Japan, Jan. 14, 1989, 1-7157

Int. Cl.[5] G03G *15/00*

U.S. Cl. 355—205 **2 Claims**



1. A control device used in an image forming apparatus whose main body is connected to one or more options through two-way serial lines comprising feeding and receiving lines, comprising:

response signal determining means for determining whether or not a predetermined response signal is sent back from an option with respect to a signal outputted from the main body of the image forming apparatus;

signal level determining means, when said response signal determining means determines that the response signal is not sent back, for determining that a signal level on the receiving serial line for sending a signal to the main body from the option is a reference level or more or less, over a predetermined constant time period, said reference level being set lower than a first signal level on the receiving serial line in a case where the option is not connected to the main body of the image forming apparatus so that one end of the receiving serial line is opened, and said reference level being set higher than a second signal level on the receiving serial line in a case where the option is connected to the main body of the image forming apparatus but the power supply of the option is off, and

state determining means responsive to an output of said signal level determining means for determining whether the main body of the image forming apparatus and the option are not connected or not, or the power supply of the option is off or not.

4,996,563

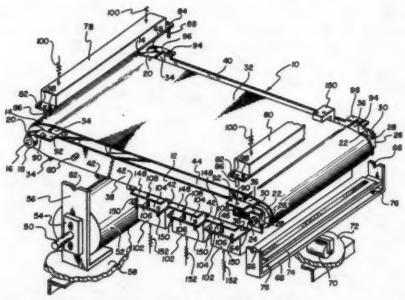
SUPPORT MEANS FOR ELECTROPHOTOGRAPHIC FILM CORE AND ASSOCIATED ELEMENTS

Douglass L. Blanding, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 11, 1989, Ser. No. 420,078

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—212 **5 Claims**



1. In an electrophotographic machine having a frame, a film core carrying an endless photoconductor belt engaged with at least two rollers and a plurality of stations cooperative with said photoconductor belt, the improvement comprising support means supporting said film core to said frame, said support means incorporating the principle of three-point suspension to maintain said film core in predetermined spatial relation to said frame while preventing distortion of said frame from imparting force to said film core through said support means, and said support means comprising first and second support members supported from said frame in spaced relation to each other and respectively engaging opposite sides of said film core and a third support member comprising a two-ended yoke engaged at its opposite ends with respective opposite sides of said film core and supported from said frame between said opposite sides of said film core, with one of said stations comprising a write-head adjustable supported by said yoke.

4,996,564

CONTROLLABLE DRIVE OF OPTICS OF A COPIER

Kouji Shirasugi, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jun. 23, 1989, Ser. No. 370,870

Claims priority, application Japan, Jun. 24, 1988, 63-156326

Int. Cl.[5] G03G *15/28*

U.S. Cl. 355—235 **6 Claims**

1. A method for controlling the driving of a scanner over a glass platen in a photocopier during an exposure and a return, comprising the steps of:

providing a motor for driving said scanner;

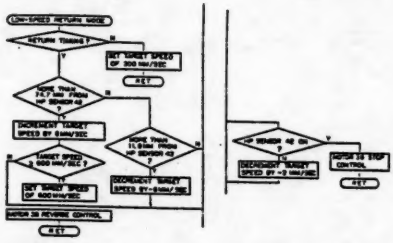
generating movement signals in response to the movement and direction of said scanner;

selecting the speed and direction of the motor in accordance with said movement signals and manually input information including a mode input;

switching between a high speed return and a low speed return according to said manually input information;

selecting a low speed return for a particular mode, in which a first image forming operation and a subsequent second image forming operation are performed on a paper sheet, such that a low speed return is selected in said first image forming operation, and a high speed return for other modes; and

generating motor driving signals to drive said motor in accordance with the selected speed and direction.



4,996,565

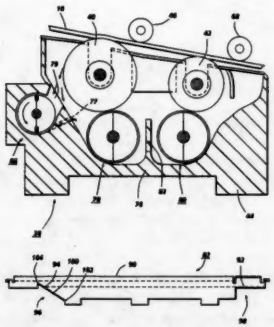
DEVELOPER MATERIAL MIXING APPARATUS

James A. Herley, Henrietta, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jun. 29, 1989, Ser. No. 373,129

Int. Cl.[5] G03G *15/06*

U.S. Cl. 355—245 **4 Claims**



1. An electrophotographic printing machine of the type in which an electrostatic latent image recorded on a photoconductive member is developed with a developer material, wherein the improvement includes,

a housing defining a chamber storing a supply of developer material therein;

first means for transporting the developer material in a first direction from one region of the chamber of said housing to another region thereof;

second means for transporting the developer material in a second direction opposed to the first direction;

means, disposed, at least partially in the chamber of said housing, for developing the electrostatic latent image recorded on the photoconductive member with developer material, said developing means receiving developer material from said first means and said second means; and

means for separating said first means from said second means, said separating means having an aperture in at least one portion thereof configured to allow developer material to gently move between said first means and said second means and adapted to reduce back up of developer material and flow unevenness, said separating means comprising a generally planar member having a sloped surface and being mounted in said housing between said first means and said second means to define a substantially vertical wall therebetween with said housing and the sloped surface of said planar member defining, in one marginal region, a slot progressively increasing in size in a direction along said planar member toward one end thereof.

4,996,566

MULTICOLOR IMAGE FORMING APPARATUS WITH SEPARATELY REMOVABLE AND INSERTABLE ASSEMBLY UNITS

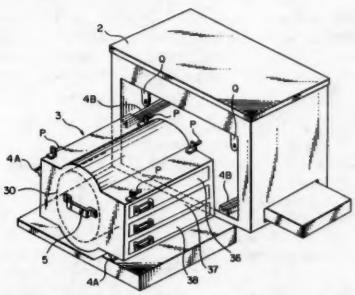
Shizuo Morita, Tachikawa; Shunji Matsuo, Hino; Satoshi Haneda, Tachikawa; Masakazu Fukuchi, and Hisashi Shoji, both of Hachioji, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Oct. 30, 1989, Ser. No. 428,902

Claims priority, application Japan, Nov. 1, 1988, 63-278205; Dec. 16, 1988, 63-318934

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—246 **15 Claims**



1. A multicolor image forming apparatus comprising:

means for carrying an image;

a plurality of developing devices of differing colors for developing a latent image formed on said image carrying means into a color toner image;

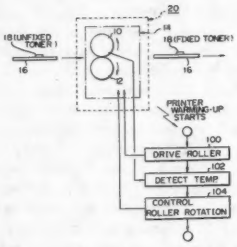
a process cartridge for housing the image carrying means and the plurality of developing devices, the process cartridge adapted to be detachably mountable in said multicolor image forming apparatus,

each of the plurality of developing devices being detachably mountable substantially in the process cartridge and each having means for indicating when its replacement is necessary due to toner consumption.

4,996,567
METHOD OF CONTROLLING FUSER UNIT OF IMAGE FORMING APPARATUS

Shinichi Watarai, Yokohama; Megumi Yasuda, Kawasaki; Yoji Hoki, Tokyo, and Makoto Inoue, Ono, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed May 9, 1989, Ser. No. 349,312
Claims priority, application Japan, May 17, 1988, 63-119878
Int. Cl.[5] G03G *15/20*
U.S. Cl. 355—290 **12 Claims**



1. A method of controlling a fuser unit of an image-forming apparatus including a heat roller having a heater and backup roller, wherein a sheet medium is nipped between the heat roller and the backup roller so that a toner image carried on the sheet medium is fixed, comprising the steps of:

(a) starting the energization of substantially at the same time as commencement of an initialization process of mechanical and electrostatic conditions of the apparatus while rotating the heat roller and the backup roller;

(b) stopping the rotation of the rollers after the initialization process has been completed;

(c) monitoring a surface temperature of the heat roller for a first predetermined period after completion of the initialization process, while keeping the heat roller and the backup roller stationary;

(d) determining that the fuser unit is ready for operation when the surface temperature has reached a set value within the first predetermined perion; and

(e) restarting rotation fo the heat roller and the backup roller until the set value is reached, when the set value is not reached within the first predetermined period and unless a second predetermined period has expired subsequent to expiration of the first predetermined period.

4,996,568
AUTOMATIC DOCUMENT FEEDER PROVIDED FOR COPYING APPARATUS

Wataru Hamakawa, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Sep. 29, 1988, Ser. No. 250,746
Claims priority, application Japan, Sep. 30, 1987, 62-248954
Int. Cl.[5] G03G *15/00*
U.S. Cl. 355—308 **4 Claims**

1. An automatic document feeder capable of transporting two documents to a specified position on a platen and arranging the documents in series at the position, which comprises:

means for receiving a plurality of documents loaded in a stack;

means for feeding documents loaded on said receiving means;

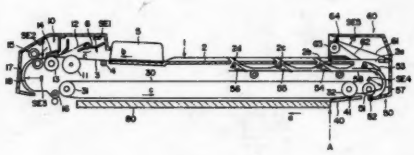
means for transporting fed documents onto said platen;

means, provided at one end of said platen, for stopping a first transported document on said platen by interfering with a leading end of the document;

means for detecting a fed document;

means for measuring a distance between the first transported document and a subsequently fed document, based on the signal output from said detecting means; and

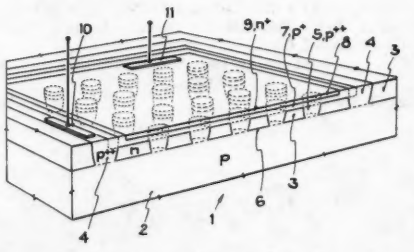
control means for stopping said transporting means during the transportation of said subsequently fed document, based on the value measured by said measuring means, in order to position the subsequently fed document on said platen adjacent the first transported document.



4,996,569
INTEGRATED CIRCUIT

Reinhold Kaiser, Heilbronn, Fed. Rep. of Germany, assignor to Telefunken electronic GmbH, Heilbronn, Fed. Rep. of Germany

Filed Nov. 2, 1988, Ser. No. 266,081
Claims priority, application Fed. Rep. of Germany, Nov. 27, 1987, 3740302
Int. Cl.[5] H01L *29/92, 27/04, 27/02*
U.S. Cl. 357—14 **12 Claims**



1. An integrated circuit array having a capacitance formed by a first pn-junction and separated from other components by a further pn-junction comprising:

a substrate of one conductivity type; an epitaxial layer of the opposite conductivity type formed on a surface of said substrate; a first semiconductor zone of said one conductivity type formed in said epitaxial layer and extending from the surface of said epitaxial layer only partially through said epitaxial layer; a second semiconductor zone of said opposite conductivity type disposed in said first semiconductor zone at said surface of said epitaxial layer and forming said first pn-junction with said first semiconductor zone; and a plurality of areas of said one conductivity type extending from said first semiconductor zone through said epitaxial layer to said substrate and electri-

cally connecting said first semiconductor zone to said substrate.

4,996,570

SEMICONDUCTOR STRUCTURE HAVING A CONDUCTIVE CHANNEL

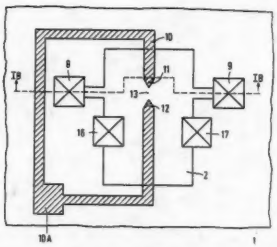
Hendrik Van Houten, Croton-on-Hudson, N.Y., and Bart J. Van Wees, Delft, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Filed Dec. 20, 1988, Ser. No. 288,063

Claims priority, application Netherlands, Dec. 23, 1987, 8703119

Int. Cl.[5] H01L *29/80*

U.S. Cl. 357—22 **20 Claims**



1. An element for use in an electric circuit comprising a layer structure, in which a multi-dimensional charge carrier gas is formed during operation and in which first and second regions are situated, which communicate with each other via a channel for transport of charge carriers, further comprising means for maintaining the electrical properties of said element at least substantially independent of changes in ambient parameters and manufacturing process parameters, said means comprising providing the channel with a length between said first and second regions which is smaller than the mean free path of the charge carriers in the charge carrier gas, and providing the channel with a width in a direction orthogonal to its length which is of the same order of magnitude as the wavelength of the charge carriers at the Fermi level, as a result of which, during operation at such a temperature that the charge carrier gas is at least substantially completely degenerated, quantization of the conductance of the channel occurs.

4,996,571

NON-VOLATILE SEMICONDUCTOR MEMORY DEVICE ERASING OPERATION

Hitoshi Kume, Musashino; Yoshiaki Kamigaki, Tokorozawa; Tetsuo Adachi, Hachioji; Toshihisa Tsukada, Musashino; Kuzuhiro Komori, Higashikurume; Toshiaki Nishimoto, Tama; Tadashi Muto, Iruma, and Toshiko Koizumi, Kokubunji, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Device Engineering Co., Ltd., Chiba, both of, Japan

Filed Jul. 6, 1989, Ser. No. 375,956

Claims priority, application Japan, Jul. 8, 1988, 63-168855

Int. Cl.[5] H01L *29/68;* **G11C** *11/34, 7/00*

U.S. Cl. 357—23.5 **4 Claims**

1. A non-volatile semiconductor memory device comprising:

a gate insulating layer disposed on a principal surface of a semiconductor substrate;

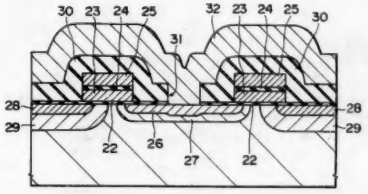
a floating gate electrode disposed on said gate insulating layer;

a control gate electrode disposed on said floating gate electrode through an interlayer insulating layer;

a source region and a drain region disposed in said semiconductor substrate near said principal surface and being spaced-apart from each other, at least one of which has a portion which has superposed thereon said floating gate electrode through said gate insulating layer;

a channel region being effected between said source region and said drain region, the part of said gate insulating layer which is on the superposed portion and that which is on said channel region adjacent thereto have a thickness which is substantially the same;

means for erasing electrically positive or negative information charge held in said floating gate electrode, said erasing being effected by applying a predetermined electric field to said gate insulating layer so as to transfer by tunneling said information charge from said floating gate electrode to one of said source and drain regions; and



means for substantially preventing occurrence of charge injection, of charge having a polarity opposite to that of said information charge, from said source region to said gate insulating layer upon occurrence of an electrical erase operation, the injection preventing means including,

means for applying a predetermined voltage to one of said source and drain regions, said predetermined voltage having such a polarity that said region is reversely biased with respect to said semiconductor substrate,

means for applying a voltage having the same polarity as said predetermined voltage, but with a relatively smaller absolute value therefrom, to said one of said source and drain regions before the application of said predetermined voltage thereto, and

means for grounding said control electrode.

4,996,572

SEMICONDUCTOR MEMORY DEVICE

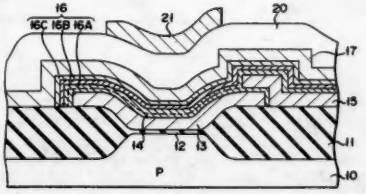
Shinichi Tanaka, Tokyo; Masayuki Hori, Yokohama, and Noriyoshi Tozawa, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 166,564, Mar. 10, 1988, abandoned. This application Dec. 11, 1989, Ser. No. 449,333

Claims priority, application Japan, Mar. 13, 1987, 62-58110

Int. Cl.[5] H01L *29/78, 29/34, 29/04*

U.S. Cl. 357—23.5 **4 Claims**



1. A semiconductor memory device comprising:

a first conductive semiconductor substrate;

a floating gate formed on the semiconductor substrate with a first insulating film inserted between said first conductive semiconductor substrate and said floating gate, said floating gate being made of polycrystal silicon which includes an impurity at a density of less than $6\times10^{20}/cm^3$;

a silicon oxide film formed on said floating gate and having a number of irregularities on its top surface;

an erase gate formed on the first insulating film and formed on part of said silicon oxide film so as to overlap part of the floating gate, said erase gate being made of polycrystal silicon which includes an impurity at a density of at least $6\times10^{20}/cm^3$;

a second insulating film formed on the silicon oxide film over the floating gate and the erase gate, said second insulating film comprising a three-layered structure made of a first silicon oxide film, a silicon nitride film and a second silicon oxide film; and

a control gate formed on the second insulating film, over the floating gate and the erase gate, said control gate being made of polycrystal silicon which includes an impurity at a density of at least $6\times10^{20}/cm^3$.

4,996,573

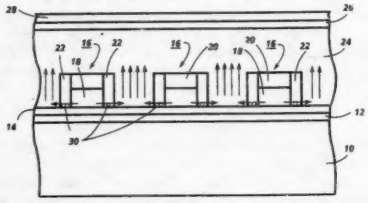
VERTICAL THIN FILM TRANSISTOR AND OPTICAL SENSOR HAVING LEAKAGE CURRENT SUPPRESSION ELEMENTS

Michael Hack, Mountain View; John G. Shaw, Portola Valley, both of Calif., and Michael Shur, Charlottesville, Va., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 27, 1989, Ser. No. 428,814

Int. Cl.[5] H01L *27/01, 27/12, 29/48, 29/10*

U.S. Cl. 357—23.700 **14 Claims**



1. A thin film transistor and sensor device comprising a substrate upon which is supported gate electrode means, gate dielectric means, source electrode means comprising source electrode fingers overlying said gate dielectric means, non-single crystal semiconductor means overlying said gate dielectric means and surrounding said source electrode means, drain electrode means contiguous with said semiconductor means, barrier means positioned adjacent said source electrode means and separated from and cooperating with said gate electrode means for preventing a drain field from reaching said source electrode means, the improvement comprising

an electrically conductive electrode through which optical energy may pass to said semiconductor means between said fingers, and wherein said source electrode means includes means for establishing an electric field between adjacent source electrode fingers, and whereby said device selectively may be operated as a transistor or as a sensor.

4,996,574

MIS TRANSISTOR STRUCTURE FOR INCREASING CONDUCTANCE BETWEEN SOURCE AND DRAIN REGIONS

Masahiro Shirasaki, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Jun. 30, 1989, Ser. No. 374,293

Claims priority, application Japan, Jul. 1, 1988, 63-164152

Int. Cl.[5] H01L *29/78*

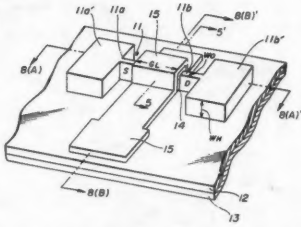
U.S. Cl. 357—23.7 **13 Claims**

1. A metal-insulator-semiconductor transistor, comprising:

a substrate having a main surface;

a semiconductor body provided on the substrate and having first and second regions doped to a first conductivity type and defining respective source and drain regions and a third region extending in a first direction between and electrically interconnecting the first and second regions and doped to a second conductivity type, opposite to the first conductivity type, the third region defining a channel region for conduction of carriers between the source and drain regions, the third, channel region of the semiconductor body having spaced side wall surfaces extending generally transversely to the main surface of the substrate and an upper surface extending in a plane substantially parallel to the main surface of the substrate, the channel region having a width W_O between the sidewalls measured in a second direction, transverse to the first direction, and a sidewall height of W_H;

a gate insulator film formed on the upper and sidewall surfaces of the third, channel region of the semiconductor body; and



a gate electrode, of a conducive material, formed on the gate insulator film in conformance with the upper surface and sidewall surfaces of the channel region as covered by the gate insulator film, a gate voltage applied to the gate electrode creating a depletion region in the channel region and wherein, where W_{MAX} defines the maximum extension of the depletion region, in an inward direction from each of the sidewall and upper surfaces of the channel region and in a plane transverse to the first direction and parallel to the second direction, and determined as a function of the impurity concentration level in the channel region, the width W_O of the third channel region is less than the height W_H of the sidewalls thereof and sufficiently smaller than the maximum extension W_{MAX}, as so determined, such that the channel region is fully depleted.

4,996,575

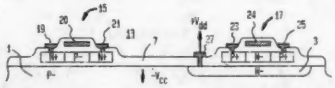
LOW LEAKAGE SILICON-ON-INSULATOR CMOS STRUCTURE AND METHOD OF MAKING SAME

Alfred C. Ipri, Princeton, and Louis S. Napoli, Hamilton Square, both of N.J., assignors to David Sarnoff Research Center, Inc., Princeton, N.J.

Filed Aug. 29, 1989, Ser. No. 400,204

Int. Cl.[5] H01L *27/01, 27/13, 29/78, 27/12*

U.S. Cl. 357—23.7 **7 Claims**



1. A complimentary metal oxide semiconductor (CMOS) device comprising:

a substrate of a semiconductor material having a lower portion of a first conductivity type;

a layer of a dielectric material over the lower portion of said substrate;

a first island of a semiconductor material of a first conductivity type over a first portion of said dielectric layer, spaced regions of the second conductivity type in said first island forming the source and drain regions of a first MOS tran-

sistor of a second conductivity type over a first portion of said dielectric layer;

a region of a second conductivity type in said substrate immediately below a second portion of said dielectric layer remote from said first portion to provide a field shield;

a second island of a semiconductor material of said second conductivity type over said second portion of said dielectric layer, spaced region of the first conductivity type in said second island forming the source and drain regions of a second MOS transistor of said first conductivity type over said second portion of said dielectric layer;

said second island being located wholly within a vertical projection of said field shield region through said second portion of said dielectric layer;

a first electrode of a conductive material electrically connected to said substrate for receiving a first bias voltage for compensating for any charge in said dielectric layer below said first MOS transistor; and

a second electrode of a conductive material electrically connected only to said field shield region for receiving a second bias voltage compensating for any charge in said dielectric layer below said second MOS transistor.

4,996,576

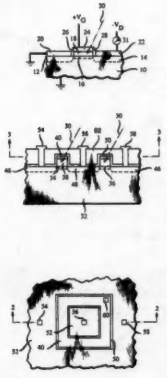
RADIATION-SENSITIVE DEVICE

William T. Lynch, Summit, and Lalita Manchanda, North Plainfield, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 933,913, Nov. 24, 1986, abandoned. This application May 15, 1989, Ser. No. 355,053

Int. Cl.[5] H01L *29/78, 31/10*

U.S. Cl. 357—29 **7 Claims**



1. In combination,

a p-channel depletion-mode MOS device adapted to be interposed in a path of non-particle ionizing radiation,

and means for determining, for a given gate voltage applied to said device, the change in source-to-drain current that results from irradiation of said device with said non-particle ionizing radiation thereby to provide a measurement of the non-particle radiation dose to which said device was exposed wherein said device comprises a gate pattern including an insulating layer of said gate having a conductive gate layer thereon, said conductive gate layer comprising n^+polysilicon.

4,996,577

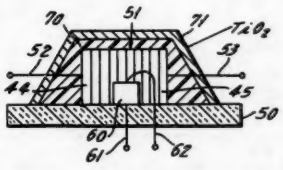
PHOTOVOLTAIC ISOLATOR AND PROCESS OF MANUFACTURE THEREOF

Daniel M. Kinzer, Riverside, Calif., assignor to International Rectifier Corporation, El Segundo, Calif.

Continuation of Ser. No. 573,305, Jan. 23, 1984, abandoned. This application Jan. 29, 1990, Ser. No. 474,625

Int. Cl.[5] H01L *27/14, 31/00*

U.S. Cl. 357—30 **43 Claims**



1. A photovoltaic isolator comprising, in combination: an LED radiation source; a photovoltaic stack having the form of a rectangular parallelepiped and which has series connected junctions extending to the vertical side of said stack; and a housing for containing said LED and photovoltaic said stack; said LED being spaced from said photovoltaic stack by greater than about 20 mils to obtain a desired dielectric isolation between said LED and said photovoltaic stack; said LED being positioned at the center of one vertical side of said stack and arranged to illuminate at least said one vertical side of said stack; said stack having a relatively short height, less than about 150 mils to improve uniformity in illumination of said at least one vertical side of said stack by said LED.

4,996,578

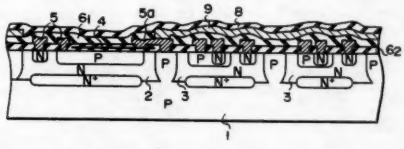
SEMICONDUCTOR DEVICE

Hideaki Motojima, and Keiji Kamasaki, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 22, 1988, Ser. No. 288,182

Int. Cl.[5] H01L *27/14*

U.S. Cl. 357—30 **4 Claims**



1. A semiconductor device including a photodetector and semiconductor elements in a semiconductor substrate, wherein said photodetector is formed on a first surface of said semiconductor substrate and converts an optical signal into an electrical signal, and said semiconductor elements are formed in a second surface of said semiconductor substrate and receive and process said electrical signal, said semiconductor device further comprising:

a first insulating film having optical transmissibility formed on said first and second surfaces of said substrate;

an optical transmissible conductive film buried in a portion of said first insulating film and electrically connected to a constant potential line of said substrate, said portion being positioned on said photodetector;

a wiring layer for connecting said optical transmissible conductive film to said substrate;

a second insulating film formed on said first insulating film and having optical transmissibility; and

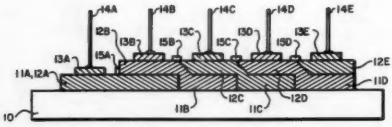
an optical shielding film formed on a portion of said second insulating film, said portion being positioned over said semiconductor elements.

4,996,579

DESIGN FOR ELECTRONIC SPECTRALLY TUNABLE INFARED DETECTOR

Tak-Kin Chu, Bethesda, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 4, 1983, Ser. No. 464,100
Int. Cl.[5] H01L *27/14, 31/00*
U.S. Cl. 357—30 3 Claims



1. An infrared detector comprising:

an infrared light transpartent substrate;

a plurality of successively adjacent optically responsive infrared semiconductor materials deposited on the substrate; with means to selectively transmit radiation and where each successive infrared semiconductor material is adapted to absorb different wave lengths of infrared light; each infrared semiconductor material forming a layer being a single uniform chemical composition and a comprising a lower filter portion and an upper detector portion; said lower portion deposited directly on the substrate with said upper portion overlying the lower portion of an adjacent infrared semiconductor material layer; whereby infrared light may pass through the substrate without absorption, in the infrared semiconductor material defining the lower portion be absorbed in respective frequency ranges, and transmitted to the upper portion of the following adjacent infrared semiconductor material layer for causing an electrical signal to be generate therein as an optical response; and ohmic and non-ohmic contacts on each upper portion of a layer whereby the magnitude of the electrical signal between said ohmic and non-ohmic contacts is responsive to the magnitude of the infrared light of frequencies in the range not absorbed in the lower portion of the previous adjacent infrared semiconductor material layer and hence transmitted to the upper portion of the optically responsive infrared semiconductor material layer;

provided that the cutoff wavelength of the following infrared semiconductor layer is longer than the cutoff wavelength of the previous infrared semiconductor material layer.

4,996,580

BIPOLAR SEMICONDUCTOR DEVICE

Takashi Kimura, Yokohama, and Mie Kato, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 13, 1988, Ser. No. 256,662
Claims priority, application Japan, Oct. 14, 1987, 62-258661
Int. Cl.[5] H01L *27/04*
U.S. Cl. 357—34 3 Claims

1. A semiconductor device comprising:

a semiconductor body of a first conductivity type;

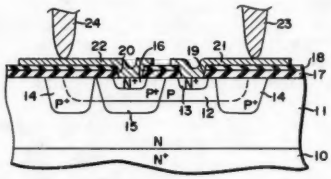
a first semiconductor region of a second conductivity type, formed in said semiconductor body;

a second semiconductor region of the first conductivity type, formed in a surface region of said first semiconductor region;

a third semiconductor region of the second conductivity type, formed in said first semiconductor region and containing an impurity having a concentration higher than that of said first semiconductor region;

a fourth semiconductor region of the first conductivity type, formed in said third semiconductor region;

an insulating film formed on said semiconductor body and having first and second openings at positions respectively corresponding to said second and fourth semiconductor regions;



a first polysilicon semiconductor layer connected to said second semiconductor region through said first opening of said insulating films and containing an impurity of the first conductivity type; and

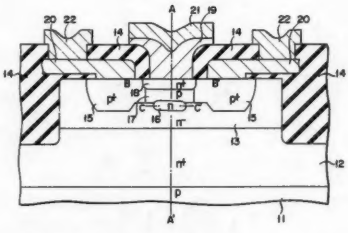
a second polysilicon semiconductor layer connected to said fourth semiconductor region through said second opening of said insulating films and containing an impurity of the first conductivity type.

4,996,581

BIPOLAR TRANSISTOR

Toshihiko Hamasaki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 2, 1989, Ser. No. 305,026
Claims priority, application Japan, Feb. 3, 1988, 63-23010
Int. Cl.[5] H01L *21/225, 21/265, 21/20*
U.S. Cl. 357—34 6 Claims



1. A bipolar transistor comprising:

an emitter region of a first conductivity type, having a predetermined width;

an inner base region of a second conductivity type, formed below said emitter region and contacting said emitter region, thus forming a PN junction;

an outer base region of a second conductivity type, having a high impurity concentration, set in contact with the side face of said inner base region and surrounding said inner base region;

an inner collector region of the first conductivity type, formed below said inner base region and contacting the bottom face of said inner base region, thus forming a PN junction; and

an outer collector region of the first conductivity type, set in contact with the bottom face of said inner collector region, contacting the bottom face of said outer base region, thus forming a PN junction, and surrounding said inner collector region,

wherein said inner collector region has a higher impurity concentration than said outer collector region; the side edge of said inner collector region is located right below,

or inner than, the side edge of said emitter region; and the top face of said inner collector region is higher and closer to said emitter region, than the top face of said outer collector region.

4,996,582

FIELD EFFECT TRANSISTOR FOR MICROSTRIP MOUNTING AND MICROSTRIP-MOUNTED TRANSISTOR ASSEMBLY

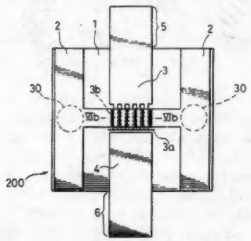
Kohki Nagahama, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha

Filed Sep. 8, 1989, Ser. No. 404,636

Claims priority, application Japan, Sep. 14, 1988, 63-230939; Jul. 26, 1989, 1-193134

Int. Cl.[5] H01L *23/48, 29/44, 29/52, 29/60*

U.S. Cl. 357—69 **12 Claims**



1. A field effect transistor chip for connection to a microstrip transmission line comprising:

a semiconductor substrate having first and second generally opposed surfaces;

a field effect transistor formed in said semiconductor substrate including a gate, a source, and a drain, all accessible from said first surface;

opposed drain and gate electrodes of substantially the same width respectively electrically connected to said drain and gate and disposed on said first surface;

a source electrode electrically connected to said source disposed partially on said first surface and forming an air bridge so that said source electrode crosses over and is electrically insulated from said gate electrode; and

a gate beam lead and a drain beam lead respectively electrically connected to said gate and drain electrodes, each beam lead including an extension extending beyond said semiconductor substrate for connection to microstrip transmission line conductors wherein said gate and drain beam leads each have widths transverse to the extension of said gate and drain beams leads beyond said substrate and the widths of said gate electrode and said gate beam electrode, and of said drain electrode and said drain beam electrode, are substantially equal, respectively.

4,996,583

STACK TYPE SEMICONDUCTOR PACKAGE

Kenzo Hatada, Katano, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 9, 1990, Ser. No. 477,542

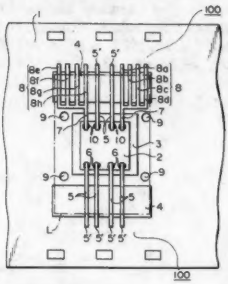
Claims priority, application Japan, Feb. 15, 1989, 1-036822

Int. Cl.[5] H01L *23/48, 23/54*

U.S. Cl. 357—70 **5 Claims**

1. A semiconductor device, comprising:

an outer lead region connected to an inner lead which is connected to an electrode terminal of a semiconductor chip, said outer lead region comprising plural divided leads each connected to said inner lead; a circuit board; a plurality of TAB packages, said semiconductor chip being packaged in said TAB packages, said TAB packages being stacked in plural layers; said stacked TAB packages being mounted on said circuit board; at least one of said plural divided leads being provided at each of said stacked layers



and a predetermined number of said plural divided leads being cut out of each of said stacked layers.

4,996,584

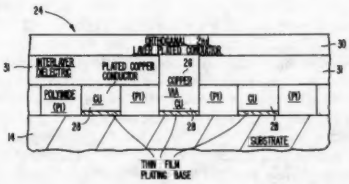
THIN-FILM ELECTRICAL CONNECTIONS FOR INTEGRATED CIRCUITS

Peter L. Young, South Barrington; Jay Cech, Elmhurst, and Kin Li, Lombard, all of Ill., assignors to Gould, Inc., Eastlake, Ohio

Continuation of Ser. No. 180,653, Apr. 11, 1988, abandoned, which is a continuation of Ser. No. 891,079, Jul. 31, 1986, abandoned, which is a division of Ser. No. 697,092, Jan. 31, 1985, Pat. No. 4,705,606. This application Oct. 13, 1988, Ser. No. 257,171

Int. Cl.[5] H01L *23/48*

U.S. Cl. 357—71 **7 Claims**



7. A device for connecting semiconductor integrated circuit chips, each chip including integrated circuit formed on a chip substrate, said device comprising:

a mounting substrate having a fist substantially planar surface; and

an interconnect signal plane formed on top of said first substantially planar surface of said mounting substrate and including a substantially planar pattern of metallic interconnect lines, each lien being in the range of 1 to 10 microns thick and 5 to 20 microns wide, and a dielectric material separating said interconnect lines, said dielectric material and said pattern of metallic interconnect lines forming a second substantially planar surface in spaced relation above said first substantially planar surface, wherein said substantially planar pattern of metallic interconnect lines is an integral portion of said second substantially planar surface, said chips being connected to said interconnect lines of said pattern.

4,996,585
ELECTRONIC PACKAGE

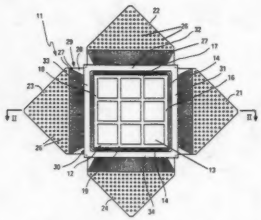
Harald Gruber, Herrenberg; Kurt Hinrichsmeyer, Sindelfingen; Heinz G. Horbach, Gechingen, and Ewald E. Stadler, Herrenberg, all of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jul. 18, 1989, Ser. No. 381,334

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1988, 3824654

Int. Cl.[5] G11C *5/04*; H01L *23/02*

U.S. Cl. 357—74 **8 Claims**



1. An electronic package comprising:

a substantially planar substrate having a plurality of conductors located thereon, said substrate of a predetermined shape and having a plurality of sides;

a plurality of integrated circuit chips located on said planar surface, said chips being electrically and mechanically connected to said conductors located on said substrate;

a plurality of pin plate members each including an electrically insulating material having a plurality of connector pins located therein, each of said pin plate members being foldable with respect to one of said sides of said substrate and of a preestablished shape different than said shape of said substrate, said pin plate members combining to form shape substantially similar in configuration and size as said substrate when so folded;

a plurality of connector elements each electrically coupling a respective one of said pin plate members to said integrated circuit chips, each of said connector elements including a flexible carrier and electrical conductors located thereon to thereby form a flexible connection between each of said pin plate members and said substrate, each of said flexible carriers being secured to said substrate along a respective one of said sides thereof; and

at least one base plate member defining a recess within one surface thereof for receiving said planar substrate and said integrated circuit chips therein and a plurality of openings within an opposite surface thereof each designed for accommodating a respective one of said connector pins therein when said pin plate members are folded.

4,996,586
CRIMP-TYPE SEMICONDUCTOR DEVICE HAVING NON-ALLOY STRUCTURE

Hideo Matsuda; Takashi Fujiwara, both of Yokohama; Yoshio Yokota; Mitsuhiko Kitagawa, both of Tokyo; Masami Iwasaki, and Kazuo Watanuki, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 17, 1989, Ser. No. 422,900

Claims priority, application Japan, Oct. 19, 1988, 63-263455

Int. Cl.[5] H01L *27/02, 23/54, 29/08*

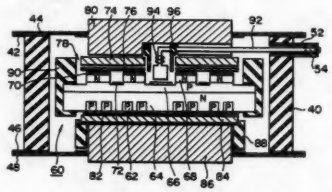
U.S. Cl. 357—74 **15 Claims**

1. A crimp-type semiconductor device comprising:

a semiconductor pellet having first and second major surfaces and having main electrodes formed on said first and second major surfaces, and a control electrode formed on at least one of said first and second major surfaces, said main electrodes and said control electrode being arranged on one of said major surfaces so as to alternately staggered with each other;

first and second electrode members, each having first and second opposing surfaces, arranged such that said first opposing surfaces are not bonded to but crimped in contact with said first and second major surfaces, respectively, each of said first opposing surfaces being formed to cover the entire surface of said main electrode;

first and second electrode post means, arranged to be not bonded to but crimped in contact with said second opposing surfaces of said first and second electrode members,



respectively, for crimping said main electrodes formed on said first and second major surfaces via said first and second electrode members, respectively, the entire surfaces of said first and second electrode post means being covered with said second opposing surfaces of said first and second electrode members, respectively; and

positioning guide means, arranged close to at least one of an inner periphery and an outer periphery of at least one of said first and second electrode members with respect to at least one of said first and second electrode post means crimped against said electrode member.

4,996,587
INTEGRATED SEMICONDUCTOR CHIP PACKAGE

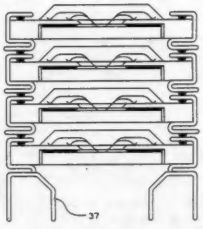
Kurt Hinrichsmeyer, Sindelfingen; Werner Straehle, Dettenhausen, both of Fed. Rep. of Germany; Gordon A. Kelley, Jr., Essex Junction, and Richard W. Noth, Fairfax, both of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 23, 1990, Ser. No. 498,134

Claims priority, application Fed. Rep. of Germany, Apr. 10, 1989, 3911711

Int. Cl.[5] H01L *23/02, 23/12*

U.S. Cl. 357—74 **9 Claims**



8. A stack of packages wherein each package comprises

a chip carrier with substantially parallel top and bottom surfaces,

a recess in the bottom surface,

at least one slot in the top surface substantially smaller than said recess communicating with the recess in the bottom surface,

electrical conductors arranged at least on the top surface of said carrier,

an integrated semiconductor chip having a major surface and contact pads on said major surface arranged in the

recess of said carrier with said contact pads positioned in the region of said slot, and

lead wires passing through said slot in connecting the contact pads on the chip to the conductors on the top side of the carrier.

4,996,588

DEVICE FOR INTERCONNECTION AND PROTECTION OF A BARE MICROWAVE COMPONENT CHIP

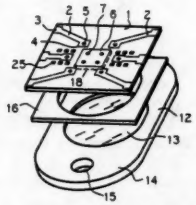
Serge Malbe, Gif sur Yvette; Evelyne Da Silva, Massy, and Alain Fouché, Paris, all of France, assignors to Thomson Hybrides et Microondes, Paris, France

Filed Mar. 21, 1989, Ser. No. 326,646

Claims priority, application France, Mar. 25, 1988, 88 03950

Int. Cl.[5] H01L *23/02, 23/12, 39/02*

U.S. Cl. 357—80 11 Claims



1. A device for interconnection and protection of a bare chip of microwave semiconductor component formed of group III-V materials, in which the interconnection circuit is located on the first face of a ceramic substrate and the semiconductor component is located on the second face of said substrate, the connection between interconnection circuit and semiconductor component being established through the substrate by means of plugged metallized holes, wherein:

the substrate is of square or rectangular shape and is adapted to carry a network of microstrip lines on its first face, a first end of said microstrip lines being in close proximity to a central pad and a second end of said microstrip lines being located on one of the two opposite edges of the substrate, the second face of said substrate being adapted to carry a ground-plane metallization having a central pad formed between reserves which are necessary for insulation of said plugged metallized holes, said central pad being of sufficient size to permit attachment thereon of at least one bare chip of semiconductor component whose terminals are connected to the plugged metallized holes by means of wires or metallic strips,

a metallic sole-piece, the central portion of which has the same dimensions as the substrate and has a portion of reduced thickness forming a compartment for housing the bare chip of semiconductor component, said sole-piece being fixed on the substrate by means of its ground plane metallization, said sole-piece being also provided on two opposite sides with two metallic end-pieces each pierced with a hole, the end-pieces being placed with respect to the substrate on the two other edges opposite to those which carry the second ends of the microstrip lines, thus making said interconnection device cascadable.

4,996,589

SEMICONDUCTOR MODULE AND COOLING DEVICE OF THE SAME

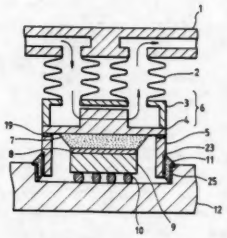
Ryoichi Kajiwara; Takao Funamoto, both of Hitachi; Mitsuo Kato, Hitachioota; Hiroshi Wachi, and Tomohiko Shida, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 17, 1988, Ser. No. 258,609

Claims priority, application Japan, Oct. 21, 1987, 62-263856; Nov. 11, 1987, 62-283318; Mar. 23, 1988, 63-67436

Int. Cl.[5] H01L *25/04*

U.S. Cl. 357—82 11 Claims



1. A cooling device for a semiconductor module having a number of semiconductor elements mounted on a wiring substrate, comprising:

(a) a cooling fin soldered on each of the semiconductor elements for cooling the semiconductor elements;

(b) a plurality of bellows each forming a channel for conducting a flow of a cooling medium, one open end of each bellows being fixed to a cooling fin;

(c) a flange connected mechanically to the other open end of each of said bellows;

(d) a housing having a channel for conducting a flow of said cooling medium, said flanges being mounted on said housing so that the channel in said housing communicates with the channels in said bellows; and

(e) a plurality of O-rings which are inserted between said flanges and said housing for sealing air-tightly said flanges to said housing, wherein said O-rings comprise a plurality of first O-rings having a first diameter for sealing air-tightly each channel for conducting the flow of said cooling medium therethrough, and at least one second O-ring having a second diameter larger than said first diameter and arranged to enclose a number of the first O-rings inside the second O-ring in the same place.

4,996,590

CIRCUITRY FOR PREVENTING DOMING PHENOMENON IN A TELEVISION RECEIVER AND A PREVENTING METHOD THEREOF

Toshikazu Okamoto, Osaka, and Fukashi Inoue, Nara, both of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Aug. 7, 1989, Ser. No. 390,329

Claims priority, application Japan, Aug. 11, 1988, 63-201628

Int. Cl.[5] H04N *9/16*

U.S. Cl. 358—74 17 Claims

1. Circuitry for preventing a doming phenomenon in a television receiver for producing a video signal, said television receiver having a screen on which a picture is reproduced, said circuitry comprising:

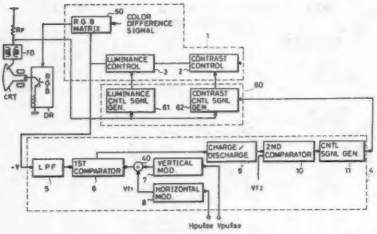
a decision means, responsive to a luminance signal included in said video signal, for deciding whether or not a high luminance portion not less than a predetermined area exists on said screen, said decision means includes

first comparison means for comparing said luminance signal with a first reference voltage,

area detection means responsive to an output of said com-

parison mean for detecting the area of the high luminance portion on said screen, and

area decision means for comparing an output of said area detecting means with a second reference voltage and for deciding whether or not said detected area is not less than a predetermined area; and



luminance/contrast reduction means, responsive to a signal for detecting the presence of the high luminance portion not less than said predetermined area from said decision means, for gradually reducing at least one of the luminance and contrast of said screen.

4,996,591

METHOD OF AND APPARATUS FOR PROCESSING COLOR IMAGE

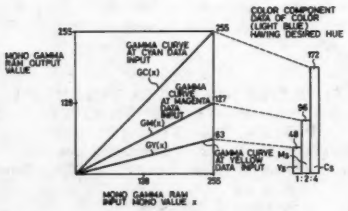
Toshihiro Kadowaki; Tetsuya Ohnishi; Koichi Katoh, all of Yokohama; Yasumichi Suzuki, Tokyo, and Toshio Honma, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 13, 1988, Ser. No. 193,936

Claims priority, application Japan, May 15, 1987, 62-119305; May 15, 1987, 62-119306

Int. Cl.[5] G03F *3/08;* H04N *1/46*

U.S. Cl. 358—80 **33 Claims**



1. An image processing apparatus comprising:

(a) hue appointing means for appointing a hue to be obtained after a conversion processing of an original image data having a gradation;

(b) density appointing means for appointing a specific density level in said original image data; and

(c) conversion means for converting, in accordance with the hue appointed by said hue appointing means and the density level appointed by said density appointing means, said original image data into a converted image data having a density level proportional to the density level of said original image data and the hue appointed by said hue appointing means.

4,996,592

VIDEO COMMUNICATION APPARATUS CAPABLE OF ELECTRONICALLY ADJUSTING THE FIELD OF VIEW OF A VIDEO FRAME

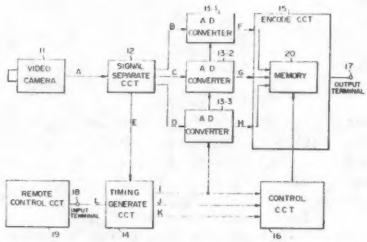
Tetsuo Yoshida, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Aug. 10, 1989, Ser. No. 391,877

Claims priority, application Japan, Aug. 12, 1988, 63-200121

Int. Cl.[5] H04N *3/22, 7/15*

U.S. Cl. 358—85 **9 Claims**



1. A video communication apparatus for converting an analog video signal representative of a scene being picked up by a video camera into a digital signal, encoding the digital signal, and transmitting the encoded signal, said apparatus comprising:

signal generating means for generating, in response to a synchronizing signal synchronous to the video signal, output signals representative of a predetermined pick-up area to be encoded which is smaller than an entire pick-up area being picked up by the video camera, and for shifting a position of said predetermined pick-up area within said entire pick-up area;

memory means for storing video data associated with the predetermined pick-up area; and

control means for controlling, in response to the output signals of said signal generating means, writing and reading operations of said memory means to selectively write only the video data associated with the predetermined pick-up area in said memory means and read the video data from said memory means;

said control means electronically adjusting the position of the predetermined pick-up area to be encoded in response to the output signals of said signal generating means.

4,996,593

A METHOD OF AND APPARATUS FOR COMPARING THE LOCATION OF AN EXTENDED FEATURE WITHIN A FIELD OF VIEW WITH A STANDARD LOCATION

Brian M. Hopkins, Ennis, Ireland, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 1, 1989, Ser. No. 444,655

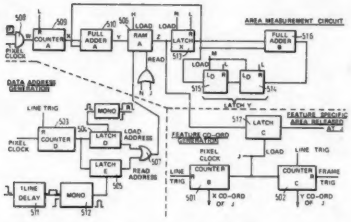
Claims priority, application Ireland, Dec. 1, 1988, 3601/88

Int. Cl.[5] H04N *7/18*

U.S. Cl. 358—101 **9 Claims**

1. A method of comparing the location of an extended feature within a field of view with a standard location, comprising scanning the field of view to obtain a binary video signal representing the feature, processing the feature signal so obtained, including delaying it by an integral number of line scan intervals and deriving from the delayed signal an end-of-feature-boundary pulse, gating the end-of-feature-boundary pulse with a stretched inverted feature signal, thereby producing a single

feature position pulse when scanning of the feature has been completed, determining the scan co-ordinates of the feature



position pulse, and comparing the co-ordinates with those corresponding to the standard location.

4,996,594

DYNAMIC IMAGE TRANSMISSION SYSTEM

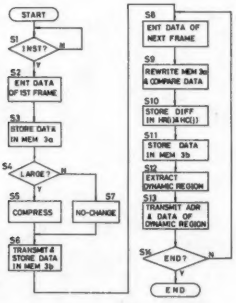
Noboru Murayama, Machida, Japan, assignor to Ricoh Company, Ltd., Japan

Filed Jul. 7, 1989, Ser. No. 376,862

Claims priority, application Japan, Jul. 8, 1988, 63-168960

Int. Cl.[5] H04N *7/12*

U.S. Cl. 358—136 **20 Claims**



1. A dynamic image transmission system comprising:

input means for inputting image data of an input image;

memory means for storing the image data successively input from said input means and for storing transmitting image data which is to be transmitted;

extracting means for extracting a dynamic region which is a portion of the input image and contains a change in image data from that of a previous frame by comparing image data of two successive frames stored in said memory means;

transmission means for transmitting the image data stored in said memory means to a transmission path as the transmitting image data; and

control means for controlling operations of said extracting means and said transmission means during an image transmission mode so that image data related to a first frame of the input image is transmitted as the transmitting image data but only the image data within the extracted dynamic region is transmitted as the transmitting image data with respect to second and subsequent frames;

said transmitting means including means for subjecting only the image data within the extracted dynamic region using both a predetermined interlace and a predetermined data compression before transmission to the transmission path.

4,996,595

FLICKER REDUCTION APPARATUS

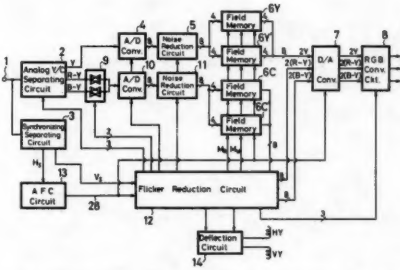
Hidefumi Naito, Kanagawa; Toshio Sarugaku, Chiba, and Masaharu Tokuhara, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Oct. 11, 1989, Ser. No. 419,901

Claims priority, application Japan, Oct. 13, 1988, 63-258290; Oct. 21, 1988, 63-265784; Jan. 30, 1989, 1-20431

Int. Cl.[5] H04N *5/06, 3/00*

U.S. Cl. 358—150 **22 Claims**



1. Apparatus for generating intermediate vertical synchronizing signals which occur between vertical synchronizing signals normally included in a conventional video signal, comprising:

a source of clock signals synchronized with horizontal synchronizing signals normally included in the conventional video signal;

a source of vertical synchronizing signals normally included in the conventional video signal;

first counter means supplied with said clock signals and said vertical synchronizing signals for providing a count representing the number of clock signals present in one-half of a field interval of said conventional video signal;

temporary storage means for storing the count provided by said first counter means during a second preceding field interval;

second counter means supplied with said clock signals and said vertical synchronizing signals for counting the number of clock signals present in said field interval; and

comparator means for comparing the count of said second counter means with the stored count for generating an intermediate vertical synchronizing signal when the compared counts are substantially equal.

4,996,596

PHASE SYNCHRONIZING CIRCUIT IN VIDEO SIGNAL RECEIVER AND METHOD OF ESTABLISHING PHASE SYNCHRONIZATION

Yoshichika Hirao, Osaka, and Nobukazu Hosoya, Nara, both of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Sep. 1, 1989, Ser. No. 401,691

Claims priority, application Japan, Sep. 2, 1988, 63-220806; Apr. 7, 1989, 1-89114

Int. Cl.[5] H04N *5/04*

U.S. Cl. 358—158 **15 Claims**

1. A circuit for providing a signal synchronized in phase with a horizontal synchronization signal included in a video signal, comprising:

oscillation circuit means, said oscillation circuit means including an oscillator having an oscillation frequency thereof controllable, and frequency dividing means for frequency-dividing an output of said oscillator in a predetermined frequency dividing ratio;

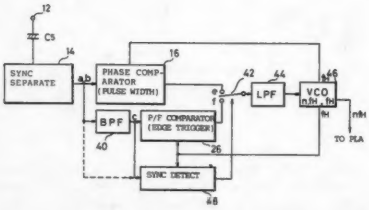
separating/extracting means for separating and extracting at

least said horizontal synchronization signal from said video signal;

first comparing means, connected to said oscillation circuit means and separating/extracting means, for comparing a phase of said horizontal synchronization signal from said separating/extracting means with a phase of an output of said frequency dividing means, said first comparing means having an output characteristic with a plurality of S curves;

bandpass means, connected to said separating/extracting means, for passing therethrough a signal of a predetermined frequency band out of an output of said separating-/extracting means, said predetermined frequency band including a frequency of said horizontal synchronization signal;

second comparing means, connected to said bandpass means



and said oscillation circuit means, for comparing at least a frequency of an output of said bandpass means with that of said frequency dividing means output, said second comparing means having an output characteristic with a single S curve;

synchronization detecting means, connected to said oscillation circuit means and said separating/extracting means, for detecting synchronization/non-synchronization of the horizontal synchronization signal extracted from said separating/extracting means with said frequency dividing means output; and

selecting means responsive to an output of said synchronization detecting means, for selecting one of the outputs of said first and second comparing means to apply the selected one to said oscillator, an output of said selecting means controlling at least the oscillation frequency of said oscillator.

4,996,597

USER PROGRAMMABLE SWITCHING ARRANGEMENT

David J. Duffield, Indianapolis, Ind., assignor to RCA Licensing Corporation, Princeton, N.J.

Filed Apr. 20, 1989, Ser. No. 340,980

Int. Cl.[5] H04N *5/268, 5/50*

U.S. Cl. 358—181 **16 Claims**

1. A signal switching arrangement for a television receiver, comprising:

a first input terminal for receiving a first signal from one of a plurality of external signal sources:

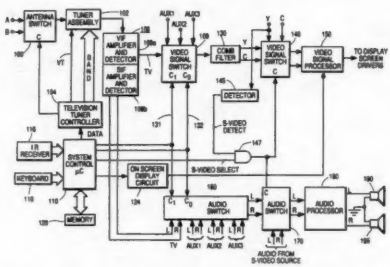
a second input terminal for receiving a second signal from another of said plurality of external signal sources;

means for entering data defining the association of one of a plurality of external signals sources with one of said input terminals in response to activation by a user, and for receiving control signals for controlling ones of said plurality of external signal sources;

memory means for storing said data;

switch means having a first input coupled to said first input terminal for receiving said first signal, a second input coupled to said second input terminal for receiving said second signal, a control terminal for receiving a switching control signal, and an output for developing a signal selected from said first and second signals in response to said switching control signal; and

control means coupled to said switch means, said memory means, and said means for entering data and receiving control signals, and having an output for developing said



switching control signal in response to the detection of said control signals for controlling said ones of said plurality of external signal sources, and in response to said stored data defining the association of said one of said plurality of external signal sources with said one of said input terminals.

4,996,598

APPARATUS FOR PROCESSING VIDEO SIGNAL

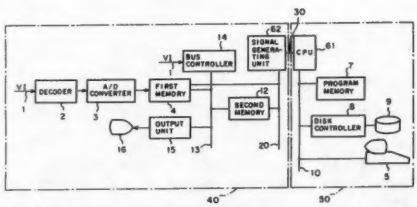
Zenichiro Hara, Nagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 19, 1989, Ser. No. 381,945

Claims priority, application Japan, Nov. 2, 1988, 63-276070

Int. Cl.[5] H04N *5/262*

U.S. Cl. 358—183 **5 Claims**



1. An apparatus for processing a video signal comprising:

a first memory for storing video image data obtained from a video signal;

a second memory for storing graphic image data such as characters and patterns;

a first bus connecting both said first and said second memories to a display and allowing for selective transmission of image data read from either of said first and said second memories to said display;

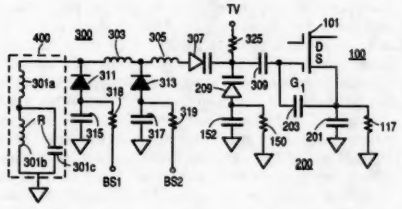
a second bus, connected to both said first and said second memories, for transmitting said graphic image data stored in said second memory and control command data relating to processing said image data using time-division multiplex transmission; and

a signal generating means for synchronously controlling the time-division multiplex transmission of data over said second bus such that said graphic image data are transmitted to said second memory during the scanning period of said video signal and said control command data are transmitted to said first memory during the flyback period of said video signal.

4,996,599
TELEVISION TUNER OSCILLATOR WITH THREE POINT TRACKING

William D. Anderson, Fox River Grove, Ill., assignor to RCA Licensing Corporation, Princeton, N.J.

Filed Apr. 14, 1989, Ser. No. 339,576
Int. Cl.[5] H04N *5/50;* H04B *1/26;* H03J *1/10*
U.S. Cl. 358—191.1 11 Claims



1. In a television receiver tuner, an oscillator having a tailored tuning response comprising:

an amplifying device having a conduction path terminated in first and second electrodes and a control electrode for controlling the condition of said conduction path,

a capacitive feedback path coupled between said first electrode and said control electrode for conditioning said amplifying device to oscillate,

tuning control means for generating a tuning voltage,

a first inductive element and a first varactor diode responsive to said tuning voltage coupled in series between said control electrode and a point of reference potential,

output means for developing an output signal of said oscillator at said second electrode, and

tailoring means comprising a second inductive element coupled with a capacitance element forming a reactance network, said reactance network coupled with said first inductive element for tailoring the frequency of oscillation vs tuning voltage transfer characteristic of said oscillator.

4,996,600
TWO DIMENSIONAL SOLID STATE IMAGE SENSING DEVICE

Yasuaki Nishida; Yoshiki Iino; Hiroshi Ohtake; Masahide Abe; Shigeo Yoshikawa, all of Tokyo; Yukio Endo, Yokohama; Yoshiyuki Matsunaga, Kamakura, and Nozomu Harada, Yokohama, all of Japan, assignors to Nippon Hoso Kyokai, Tokyo and Kabushiki Kaisha Toshiba, Kawasaki, both of, Japan

Filed Jun. 8, 1989, Ser. No. 363,085
Claims priority, application Japan, Jun. 8, 1988, 63-139519
Int. Cl.[5] H04N *3/14*
U.S. Cl. 358—213.22 15 Claims

1. A solid state image sensing device comprising:

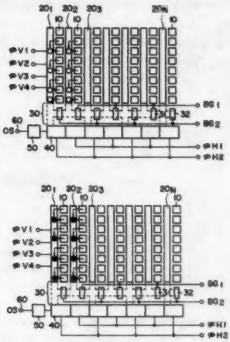
a great number of light receiving elements arrayed in matrix form and including vertically arrayed light received element;

a plurality of first charge transfer means coupled to said vertically arrayed light receiving elements for vertically transferring signal charges sensed thereby

second charge transfer means for horizontally transferring signal charges transferred from said plurality of first charge transfer means;

adder means for adding together signal charges sensed by a predetermined number of light receiving elements adjoining vertically and horizontally to provide one added signal charge, and providing a plurality of added signal charges for all of said receiving elements in each field; and

field switching means for introducing into said adder means signal charges obtained from said light receiving elements

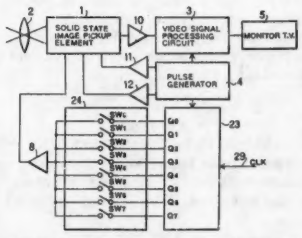


shifted by at least one light receiving element in alternate fields.

4,996,601
VARIABLE-DELAY SIGNAL GENERATING APPARATUS FOR DRIVING SOLID-STATE IMAGE PICK-UP DEVICE

Iwao Arimori, Nagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 29, 1989, Ser. No. 372,818
Claims priority, application Japan, Sep. 6, 1988, 63-224116
Int. Cl.[5] H04N *3/14*
U.S. Cl. 358—213.31 3 Claims



1. An apparatus for driving a solid-state image pickup device comprising:

signal generating means for generating a driving signal to be supplied to the solid-state image pickup element, electrically converting a light image, to read the converted output signal therefrom;

video signal processing means for processing the output signal from the solid-state image pickup element to convert it to a video signal;

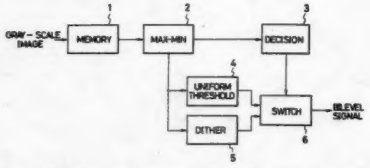
a shift register for shifting the driving signal to be supplied to the solid-state image pickup element using a clock signal having a shorter period than the period of the driving signal and outputting the driving signal with different delay times at its plural stages; and

selecting means for selecting a driving signal with a desired delay time out of the output signal at the plural stages of the shift register to supply the selected signal to the solid-state image pickup element.

4,996,602
IMAGE-PROCESSING APPARATUS

Fumitaka Ono, and Takayoshi Semasa, both of Kamakura, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 23, 1989, Ser. No. 355,345
Claims priority, application Japan, May 23, 1988, 63-126108
Int. Cl.[5] H04N *1/40*
U.S. Cl. 358—457 **30 Claims**



1. An image-processing apparatus for converting an input image having pixels with multiple gray levels to a bilevel output signal, comprising:

gray-scale image memory means for storing said input image;

maximum-minimum detection means for reading said stored input image from said gray-scale image memory means, testing respective blocks of plural pixels centered on respective pixels of said stored input image, finding the maximum and minimum gray levels therein, and furnishing said maximum and minimum gray levels as output;

decision means for receiving said maximum and minimum gray levels, deciding therefrom whether respective pixels are gray-scale pixels or bilevel pixels, and generating a control signal accordingly;

uniform-threshold binarizing means for receiving said stored input image read by said maximum-minimum detection means, thresholding it against a uniform threshold, and thereby generating a first bilevel signal;

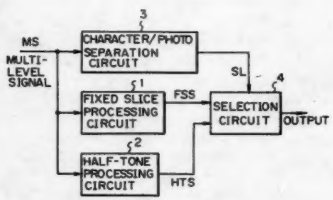
dither-matrix binarizing means for receiving said stored input image read by said maximum-minimum detection means, thresholding it using a dither matrix, and thereby generating a second bilevel signal; and

switch means for selecting said first bilevel signal or said second bilevel signal, according to said control signals, as said bilevel output signal.

4,996,603
IMAGE PROCESSING SYSTEM

Norio Kanemitsu; Yoshio Tabata, both of Kawasaki, and Masaru Wakabayashi, Ishikawa, all of Japan, assignors to Fujitsu Limited, Kawasaki and PFU Limited, Ishikawa, both of, Japan

Filed Jun. 28, 1989, Ser. No. 372,453
Claims priority, application Japan, Jun. 28, 1988, 63-159621
Int. Cl.[5] H04N *1/40*
U.S. Cl. 358—462 **7 Claims**



1. An image processing system for obtaining a binary signal from a multi-level signal read by an image scanner from an original document including mixed characters, ruled lines, and photos, and then obtaining a reproduced image from said binary signal, said image processing system comprising:

fixed slice processing means for receiving said multi-level signal, for slicing said multi-level signal by a predetermined fixed threshold level, and for outputting said binary signal sliced by said fixed threshold level;

half-tone processing means for receiving said multi-level signal, for slicing said multi-level signal by a plurality of threshold levels defined by a dither method, and for outputting said binary signal sliced by said plurality of threshold levels defined by said dither method;

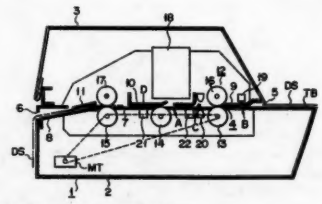
character/photo separating means for receiving said multi-level signal, for detecting a pattern of said multi-level signal, for separating either a character portion or a photo portion based on said pattern and for outputting a selection signal, said character/photo separating means comprises a successive gray color detection circuit for receiving said multi-level signal, and for obtaining binary signals after slicing said multi-level signal based on said fixed threshold level, and detecting a number of said binary signals occurring in succession within one line of said binary signal; and a fine line detection circuit for receiving said multi-level signal, and for detecting a change of density level of said multi-levels signal between adjacent lines; and

selection means for selecting either said fixed slice processing means or said half-tone processing means based on said selection signal from said character/photo separating means.

4,996,604
IMAGE SCANNER

Izumi Ogawa, Shizuoka; Kazuyoshi Kurihara, Numazu; Seigo Uchida, Shizuoka, and Takashi Nishijima, Numazu, all of Japan, assignors to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed Jul. 27, 1988, Ser. No. 224,983
Claims priority, application Japan, Jul. 31, 1987, 62-193233; May 16, 1988, 63-64336[U]
Int. Cl.[5] H04N *1/00*
U.S. Cl. 358—474 **5 Claims**



1. An image scanner comprising:

a convey path for a document sheet, said convey path having first and second ends, one of said ends including a document sheet inserting and collecting region;

a plurality of convey rollers for moving the document sheet along said convey path;

image sensing means, disposed at a position between the first and second ends of said convey path, for reading an image from said document sheet while said document sheet passes in front of said image sensing means; and

driving means for driving said convey rollers to move the document sheet toward the second end of said convey path and past said image sensing means when the document sheet is initially set at said inserting and collecting region of said convey path, and for driving said convey rollers and to move the document sheet back past said image sensing means and back to said inserting and collecting region of said convey path after the document sheet has passed said image sensing means;

said plurality of convey rollers including a pair of rollers disposed at a position between said image sensing means

and the second end of said convey path and cooperatively coupled with each other to prevent an idle movement of said document sheet;

said driving means including control means for causing a rotational direction of said convey rollers to be reversed while a trailing edge of said document sheet is moved between said image sensing means and the pair of said rollers.

4,996,605

METHOD AND APPARATUS FOR IMAGE SCANNING INPUT FOR AN IMAGE SCANNING RECORDING APPARATUS

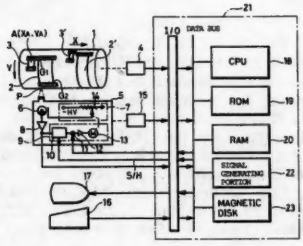
Yoshihiro Taniguchi, and Hideaki Hashimoto, both of Kyoto, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Japan

Continuation of Ser. No. 225,048, Jul. 27, 1988, abandoned. This application Mar. 22, 1990, Ser. No. 497,834

Claims priority, application Japan, Jul. 30, 1987, 62-190973

Int. Cl.[5] H04N *1/04*

U.S. Cl. 358—474 **15 Claims**



1. A method of efficiently and precisely reading a plurality of originals, comprising the steps of:

(a) locating at least a first reference portion, a first original, a second reference portion and a second original on a holder, said first reference portion, said first original, said second reference portion and said second original being successively arranged in a sub-scanning direction, said first reference portion being immediately adjacent to said first original, and second reference portion being immediately adjacent to said second original;

(b) subsequently, moving said scanning means in said sub-scanning direction until said scanning means is in position to receive light from said first reference portion, and then calibrating said scanning means as a function of light received by said scanning means from said first reference portion;

(c) subsequently, moving said scanning means in said sub-scanning direction and using said scanning means to optically read said first original;

(d) subsequently, moving said scanning means in said sub-scanning direction until said scanning means is in position to receive light from said second reference portion, and then calibrating said scanning means as a function of light received by said scanning means from said second reference portion; and

(e) subsequently moving a scanning means in said sub-scanning direction and using said scanning means to optically read said second original;

wherein said holder is moved continuously in said main scanning direction during and between steps (b) through (e).

4,996,606

LIGHT EMITTING DEVICE AND ORIGINAL READING APPARATUS HAVING THE DEVICE

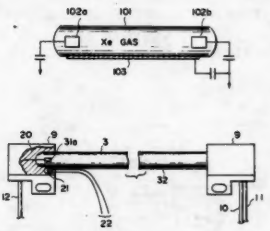
Tatsundo Kawai, Hiratsuka; Makoto Ogura, Yokohama; Koji Tomoda, Atsugi; Hiroo Ichihashi, Chigasaki; Shinichi Seitoh, Atsugi; Yasuo Kuroda, Sagamihara, and Hiroyuki Noguchi, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 14, 1988, Ser. No. 270,511

Claims priority, application Japan, Nov. 14, 1987, 62-288198; Dec. 28, 1987, 62-201506[U]; Dec. 28, 1987, 62-201507[U]; Dec. 28, 1987, 62-201508[U]; Dec. 28, 1987, 62-201509[U]; Dec. 29, 1987, 62-200536[U]

Int. Cl.[5] H01J *61/16, 61/54;* H04N *1/04*

U.S. Cl. 358—475 **33 Claims**



1. An image reading apparatus comprising:

a light emitting device for illuminating an original, said light emitting device having a xenon glow lamp and a light source for illuminating a vicinity of a main electrode of the glow lamp;

an image sensor for converting optical information from the original into an electric signal;

a controller for controlling an operation of reading an image of the original; and

a driven for driving the xenon glow lamp and the light source, said driver being operated by said controller.

4,996,607

AUDIO SIGNAL RECORDING APPARATUS

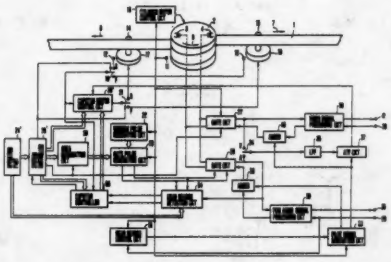
Motokazu Kashida, Tokyo; Toshiyuki Masui, Kanagawa; Tsutomu Fukatsu, Kanagawa; Masahiro Takei, Kanagawa; Kouji Takahashi, Kanagawa, and Tomohiko Sasatani, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 816,425, Jan. 6, 1986, abandoned. This application Aug. 11, 1989, Ser. No. 392,476

Claims priority, application Japan, Jan. 17, 1985, 60-6281; Jan. 18, 1985, 60-7119; Jan. 19, 1985, 60-7696

Int. Cl.[5] G11B *20/10, 27/19*

U.S. Cl. 360—18 **8 Claims**



1. An audio signal recording apparatus, comprising:

(a) detecting means for detecting a silent part of an incoming

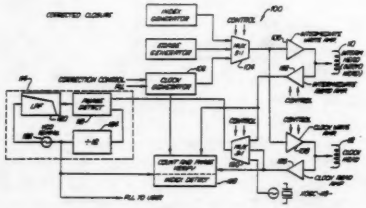
audio signal within said audio signal corresponding to less than a threshold volume and generating a detection signal;
(b) means for generating a reference signal of a predetermined frequency;
(c) modulating means for modulating said incoming audio signal to produce a modulated audio signal;
(d) superimposing means for superimposing said reference signal on said modulated audio signal in response to said detection signal to produce a recording signal; and
(e) recording means for recording said recording signal on a record bearing medium.

4,996,608

DISK DRIVE CLOCK WRITER

Douglas F. Widney, Camarillo, Calif., assignor to Data Exchange Corporation, Camarillo, Calif.

Filed Nov. 1, 1988, Ser. No. 265,788
Int. Cl.[5] G11B 5/09
U.S. Cl. 360—51 **10 Claims**



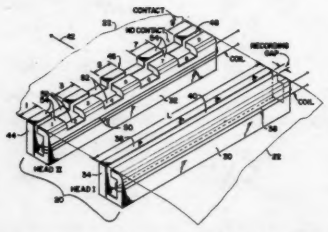
1. A disk drive clock writer for writing a clock pattern having a predetermined number of clock pulses around a clock track of a magnetic memory disk, comprising:
means for writing a preliminary clock pattern on the disk, said preliminary clock pattern having a number of clock pulses approximately equal to the predetermined number of clock pulses; and
means for reading the preliminary clock pattern to verify the actual number of clock pulses; and
means responsive to the reading means for writing a second clock pattern on the disk, which includes means for generating a source signal in phase with the preliminary clock pattern and correction means for advancing or retarding the phase of selected individual pulses of the source signal so that the second clock pattern has said predetermined number of clock pulses.

4,996,609

MAGNETIC HEAD RECORDING MULTITRACK SERVO PATTERNS

Kyriacos Joannou, Wayland, Mass., assignor to Pericomp Corporation, Natick, Mass.

Filed Feb. 22, 1989, Ser. No. 313,719
Int. Cl.[5] G11B 5/02
U.S. Cl. 360—57 **34 Claims**



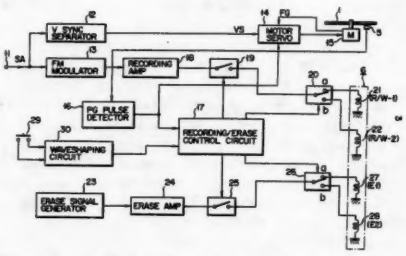
1. Apparatus for prerecording track positioning signals on a magnetic recording medium so as to accurately and simultaneously predefine a plurality of space apart recording tracks on said recording medium across the recording width of said medium, said apparatus comprising:
magnetic head means for simultaneously writing a track positioning signal pattern across the recording width of said magnetic recording medium so as to simultaneously define the positions of said tracks on said medium as a function of the locations of said signals on said medium, said magnetic head means comprising (a) a first write head for recording a first signal pattern on said recording medium, and (b) a second write head, spaced from first write head, for recording a second signal pattern on said recording medium recorded over portions of said first signal pattern so that said first and second signal patterns combine to create said track positioning signal pattern of n alternating steps of said first and second signal patterns so as to define at least n-1 of said recording tracks;
means for moving said magnetic recording medium relative to said first and second write heads so that said track positioning signal pattern is recorded on said medium; and
means, coupled to said first and second write heads, for generating said first and second signal patterns as said recording medium is moved relative to said magnetic head means.

4,996,610

DISK-TYPE MAGNETIC RECORDING APPARATUS WITH VIDEO SIGNAL DISCRIMINATION MEANS

Yutaka Yunoki, Vira Kunitachi 402, 23–11 Higashi 4-chome, Kunitachi-shi, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 166,875, Mar. 11, 1988, abandoned, which is a division of Ser. No. 796,573, Oct. 28, 1985, Pat. No. 4,742,404. This application Oct. 20, 1989, Ser. No. 425,505
Claims priority, application Japan, Mar. 13, 1984, 59-47865; Mar. 13, 1984, 59-47866; Mar. 13, 1984, 59-47867; Mar. 13, 1984, 59-47868; Mar. 13, 1984, 59-47869; Mar. 13, 1984, 59-47870
Int. Cl.[5] G11B 5/012
U.S. Cl. 360—61 **26 Claims**



1. A magnetic recording apparatus using a rotatable magnetic disc as a recording medium, comprising:
magnetic head means for erasing and recording data with respect to said magnetic disk;
discriminating means for discriminating whether or not image data is supplied to said apparatus as recording data to be recorded on said magnetic disk via said magnetic head means;
first sync signal generating means for generating a first sync signal based on a sync signal extracted from a supplied image data to be recorded;
second sync signal generating means for generating a second sync signal based on a sync signal extracted from data other than image data which is supplied to said magnetic head means to be recorded;
means for generating a rotational state detecting signal for

said magnetic disk, which indicates a rotational state of said magnetic disk;

phase-servo control means for establishing a regular rotation speed and phase of said magnetic disk corresponding to a type of data to be recorded based on both a timing signal supplied thereto and a rotational state detecting signal for said magnetic disk;

means for selectively supplying one of said first sync signal and said second sync signal to said phase-servo control means as said timing signal in response to a discrimination result of said discriminating means; and

means for selectively supplying the image data or the data other than image data to said magnetic head means in response to a discrimination result of said discriminating means.

4,996,611

TAPE POSITION DATA INDICATING APPARATUS FOR CASSETTE TAPE PLAYER

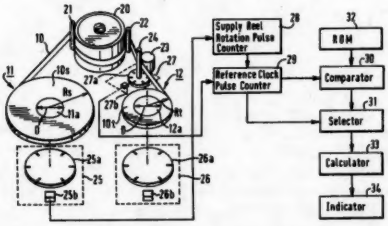
Masahiro Ito, Saitama, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Aug. 30, 1988, Ser. No. 238,220

Claims priority, application Japan, Aug. 31, 1987, 62-216648

Int. Cl.[5] G11B *15/18*

U.S. Cl. 360—72.3 **18 Claims**



1. A tape position data indicating apparatus for a cassette tape player wherein a tape is wound between a supply reel and a take-up reel comprising:

reel driving means for rotating the take-up reel for transporting the tape from the supply reel to the take-up reel;

detecting means for detecting a rotation period of either of the reels;

calculating means responsive to the rotation period detected by the detecting means for obtaining an approximated tape position data according to a prescribed linear equation;

means for indicating the approximated tape position data;

means for storing prescribed constants associated with the linear equation; and

means for supplying the prescribed linear equation constants stored in the storing means to the calculating means.

4,996,612

CASSETTE LOADING APPARATUS HAVING OPTIMUM ERROR PROTECTION DEVICE

Kenichi Suda, Fukaya, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 27, 1989, Ser. No. 457,959

Claims priority, application Japan, Dec. 28, 1988, 63-333606

Int. Cl.[5] G11B *5/008*

U.S. Cl. 360—96.5 **3 Claims**

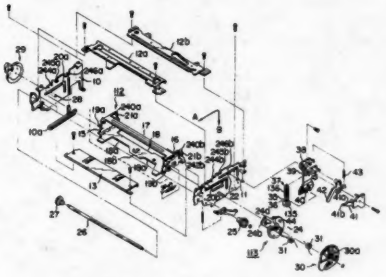
1. A cassette loading apparatus comprising:

a cassette holder which houses a cassette to be loaded and is arranged to be movable along a substantially horizontal moving path;

cassette detecting means which is arranged on said cassette holder and is set at an operative position and a nonoperative position in accordance with the presence/absence of the cassette;

loading means for selectively driving said cassette holder so as to load the cassette from an insertion position to a driving position and to unload the cassette from the driving position to an ejecting position;

a plurality of lock means, arranged on the moving path of said cassette holder at predetermined intervals, for locking said cassette detecting means by using one of said lock



means when said cassette detecting means is set at the nonoperative position; and

control means for allowing said loading means to perform loading in response to insertion of the cassette, allowing said loading means to perform unloading in response to an ejecting operation, and switching a loading operation of said loading means to an unloading operation when one of said plurality of lock means locks said cassette detecting means during execution of loading by said loading means.

4,996,613

SPINDLE MOTOR WITH NON-CONTACT SEAL

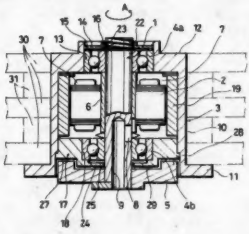
Noriaki Hishida, Kyoto, Japan, assignor to Nippon Densan Corporation, Kyoto, Japan

Filed Nov. 15, 1988, Ser. No. 271,434

Claims priority, application Japan, Nov. 25, 1987, 62-179170[U]

Int. Cl.[5] G11B *17/02*

U.S. Cl. 360—99.08 **10 Claims**



1. A spindle motor comprising:

stationary means including a stator for generating a rotating magnetic field;

rotary means rotatably supported on said stationary means by a pair of axially spaced bearings and electromagnetically rotated by said rotating magnetic field, said rotary means including a hub for supporting at least one article to be rotated therein:

a small annular clearance associated with at least one of said bearings, said clearance being located on the side of said one bearing axially away from the other bearing to communicate with the exterior of the spindle motor, said clearance being formed between a pair of opposed cylin-

drical surfaces of said stationary means and said rotary means; and

at least one helical groove formed at said annular clearance on at least one of said cylindrical surfaces for forming an air flow along said helical groove toward said one bearing when said rotary means is rotated in a predetermined rotational direction relative to said stationary means.

4,996,614

MAGNETIC RECORDING APPARATUS HAVING DUST REMOVING SURFACE FEATURE

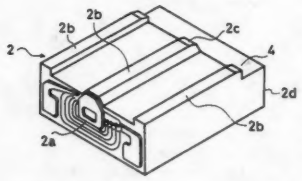
Naohiro Okutsu, Kanagawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 7, 1989, Ser. No. 447,562

Claims priority, application Japan, Dec. 8, 1988, 63-310656

Int. Cl.[5] G11B *5/60*

U.S. Cl. 360—103 **19 Claims**



1. A magnetic recording apparatus comprising a magnetic disk rotated by drive means, a magnetic head having a front end, an upper and lower surface, the lower surface located over the magnetic disk, and a slider affixed to the lower surface of the magnetic head, said slider held floated and defining a gap relative to the disk, the gap created by an air stream generated with the rotation of said magnetic disk, said magnetic head being provided at the front end with a stepped portion extending laterally across substantially the entire front end thereof to promote dust removal from beneath the magnetic head.

4,996,615

HEAD ASSEMBLY

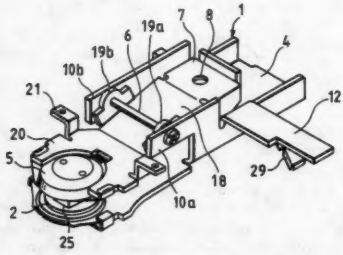
Atsushi Iwanaga, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Aug. 30, 1988, Ser. No. 239,161

Claims priority, application Japan, Dec. 4, 1987, 62-184317[U]; Jan. 9, 1988, 63-839[U]; Jan. 12, 1988, 63-2273[U]; Jan. 14, 1988, 63-3524[U]; Jan. 19, 1988, 63-4199[U]; Jan. 19, 1988, 63-7642[U]

Int. Cl.[5] G11B *5/54, 21/21*

U.S. Cl. 360—104 **4 Claims**



1. A head assembly including a carriage bearing a lower head unit and an arm bearing an upper head unit, said carriage being transported along a guide shaft in a radial direction on a surface of a recording disk, comprising an improvement wherein:

said arm includes a pivot shaft position located at a center of gravity of said arm including said upper head unit, and said arm is supported directly on said carriage at the pivot shaft position;

wherein said arm has no attached balance weight and is not supported by a spring; and

wherein said shield plate defines in an upper surface thereof a positioned hole for adjusting the position of the magnetic head.

4,996,616

HEAD SUSPENSION LOAD BEAM WITH REINFORCING RIBS

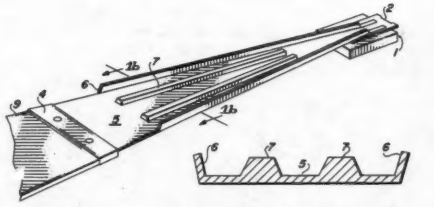
Akihiko Aoyagi, Yamato; Tatsuya Endo, Fujisawa, and Hiroshi Terashima, Fujisawa, all of Japan, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 19, 1989, Ser. No. 340,335

Claims priority, application Japan, Apr. 22, 1988, 63-98477

Int. Cl.[5] G11B *5/48, 5/60*

U.S. Cl. 360—104 **1 Claim**



1. A head suspension load beam including a flat thin base portion secured to a head actuator arm at one end and supporting a head at the other end, said load beam being reinforced by (a) bending opposite side margin portions in a longitudinal direction of said base portion at substantially right angles to a plane of said base portion, and (b) providing a pair of reinforcing ribs on said base portion, each reinforcing rib having a trapezoidal cross section and being not higher than said side margin portions and substantially parallel to a respective one of said side margin portions, whereby a desired spring constant and degree of rigidity can be achieved with side margin portions and reinforcing ribs of reduced height.

4,996,617

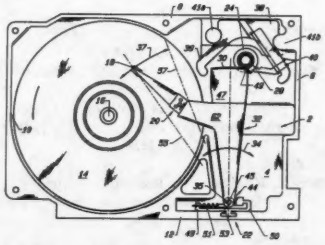
DISC DRIVE SAFETY LATCH USING SHAPE MEMORY METALS

John R. Yaeger, Sunnyvale, and Suzanne R. Wilkins, Capitola, both of Calif., assignors to Seagate Technology, Inc., Scotts Valley, Calif.

Filed Jan. 23, 1989, Ser. No. 299,400

Int. Cl.[5] G11B *5/54, 21/22*

U.S. Cl. 360—105 **15 Claims**



1. In a data storage device including a frame and one or more rotating discs, at least one data transducer positioned in close

proximity to a major surface of each said disc which has a data storage region comprising a plurality of adjacent data storage tracks for writing and reading data on said surface and a rest position for its respective transducer, a transducer supporting arm for supporting and moving each said data transducer relative to said surface, and drive means for moving said arm;

an improved safety latch for locking each said transducer at said rest position in the absence of disc rotation comprising

a flexible spring arm mounted horizontally adjacent said transducer supporting arm, and

a shape memory alloy element operatively connected between said frame and said flexible arm,

said shape memory alloy element having a martensitic phase and an austenitic phase,

said shape memory alloy element in one of the martensitic and austenitic conditions cooperating with said flexible arm to elastically deform said flexible arm to allow said transducer supporting arm to position said transducer relative to said disc,

said shape memory alloy element in the other of the martensitic and austenitic conditions operating in a tensile mode and cooperating with the flexible arm to capture said transducer supporting arm and hold each said transducer at said rest position, and

bias means for actively causing said shape memory alloy to change from said martensitic to said austenitic condition.

4,996,618

MAGNETIC DISK APPARATUS HAVING ADDITIONAL CARRIAGE ADAPTED TO PREVENT ADSORPTION OF MAGNETIC HEAD

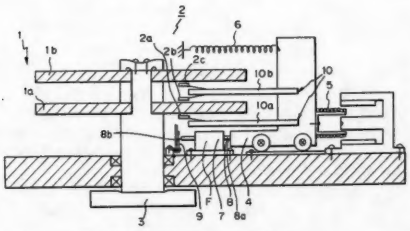
Masatoshi Kakuda, Kanagawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 23, 1989, Ser. No. 300,577

Claims priority, application Japan, Jan. 26, 1988, 63-15598

Int. Cl.[5] G11B *5/55, 21/08*

U.S. Cl. 360—106 **8 Claims**



1. A magnetic disk apparatus comprising:

a magnetic disk adapted to have information recorded thereon and including an information recording portion and means defining separate predetermined and stand-by positions, said predetermined and stand by positions both being locations free of normal recording and reproducing information;

means for rotating said magnetic disk;

magnetic head means for recording and reproducing the information onto and from said magnetic disk;

carriage means for moving and positioning said magnetic head;

wherein, when the rotation of said magnetic disk is started, said magnetic head means rises from the predetermined position on said magnetic disk, and when the rotation of said magnetic disk is stopped, said magnetic head means comes to rest at said predetermined position;

and control means for enabling said magnetic head to move between said predetermined position and the standby position and including means for moving the magnetic head from said predetermined position to said standby position once the rotation of said magnetic disk is stopped, and means for moving the magnetic head from said standby position to said predetermined position after initiation of said means for rotating but prior to the rotation of said magnetic disk whereby the tendency of said magnetic head to be affected by adsorption phenomenon is inhibited.

4,996,619

APPARATUS FOR ADJUSTABLY SUPPORTING A HEAD CARRIAGE

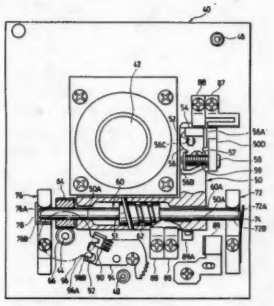
Kenji Negishi; Hidemi Sasaki, and Takeshi Fujishiro, all of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 149,237, Jan. 27, 1988, Pat. No. 4,873,598. This application Sep. 6, 1989, Ser. No. 403,433

Claims priority, application Japan, Feb. 5, 1987, 62-25431; Feb. 5, 1987, 62-25432; Feb. 10, 1987, 62-30038; Feb. 10, 1987, 62-30039; Mar. 26, 1987, 62-73676

Int. Cl.[5] G11B *21/24, 5/56*

U.S. Cl. 360—109 **6 Claims**



1. A method of supporting a head carriage, adhesively bonded to a magnetic head and being movable in the radial direction of a rotating magnetic disc to magnetically record or reproduce from said magnetic disc, the movement of the head carriage being along a guide shaft for guiding said head carriage, the guide shaft defining an axial direction and being supported at its opposite ends by a respective bearing, the method comprising:

allowing at least one of said bearings to be moveable freely in a direction perpendicularly intersecting the axial direction of said guide shaft, and,

after said magnetic head is adhesively bonded to said head carriage, moving said freely movable bearing to thereby parallelly move or incline said head carriage within a plane parallel to a magnetic recording/reproducing surface so as to adjust the azimuth shift of said magnetic head.

4,996,620

ELECTROMAGNETIC TRANSDUCERS HAVING E-SHAPED CORES AND SHIELDING THEREBETWEEN

Gregory A. Orton, Fremont, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Division of Ser. No. 116,110, Oct. 30, 1987, Pat. No. 4,894,738. This application Nov. 9, 1989, Ser. No. 434,670

Int. Cl.[5] G11B *5/265, 5/115*

U.S. Cl. 360—121 **3 Claims**

2. An erase-write-read magnetic transducer structure comprising: said transducer structure comprising a pair of transducers, each transducer including

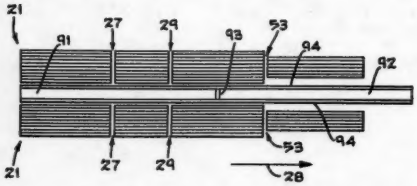
an E-shaped magnetically permeable core member having central, back and outer arms and having a first coil linked with the central arm and having the back and outer arms passing around the outside of said first coil and defining

with the central arm two pairs of confronting pole piece portions constituting a pair of erasing transducing gaps of low magnetic permeability, and

said core member also having a magnetically-permeable C-shaped extension portion and a second electrically-conducting coil passing around the outside therof and defining a pair of confronting pole piece portions constituting a read-write transducing gap of low magnetic permeability;

said pair of transducers being mounted in close parallel relationship for tracing adjacent tracks in movement with respect to a recording medium;

a unitary, one-piece magnetic shielding member mounted in parallel with and between said transducers of said pair for minimizing cross-talk between said transducers;



said shielding member having an erase shield portion and a read-write shield portion in the same plane between and parallel to said transducers and said portions being made of different materials; the erase shield portion being disposed between the erase gaps of said respective transducers, and the read-write shield portion being disposed between the read-write gaps of said respective transducers, said shield portions having a joint therebetween located intermediately of each read-write gap and the adjacent erase gaps; and

a pair of generally planar web members arranged in sandwiching relation to said erase and read-write shield portions and bonded thereto to form a unitary one-piece shield construction.

4,996,621

SUPERCONDUCTING DEVICE FOR READING INFORMATION FROM A MAGNETIC RECORDING MEDIUM

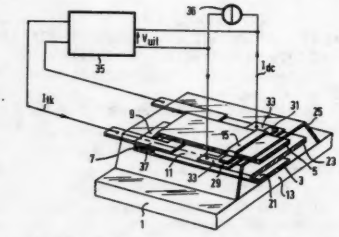
Jacobus J. M. Ruigrok; Victor Zieren, both of Eindhoven; Ulrich E. Enz, Geldrop, and Willem F. Druyvesteyn, Eindhoven, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 28, 1988, Ser. No. 265,362

Claims priority, application Netherlands, Nov. 2, 1987, 8702607

Int. Cl.[5] G11B *5/147*

U.S. Cl. 360—126 **17 Claims**



1. A device for reading information from a magnetic recording medium, which device comprises a transducing element and the magnetic yoke co-operating with the transducing element, the yoke being provided with a first flux guide and a second flux guide spatially separated locally therefrom, said device also having a face for magnetic flux coupling of the transducing element with the magnetic recording medium, characterized in that the transducing element is constituted by a superconducting quantum interference device (SQUID), provided with connection means for connecting the SQUID to a detection circuit.

4,996,622

MAGNETIC DISK WITH TEXTURED AREA ON PART OF DISK

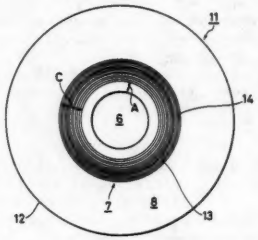
Nobuyuki Takatsuki, Yokkaichi, and Kyoichi Shukuri, Yokohama, both of Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan

Filed Dec. 18, 1989, Ser. No. 451,789

Claims priority, application Japan, Mar. 16, 1988, 63-34816

Int. Cl.[5] G11B *5/82*

U.S. Cl. 360—135 **10 Claims**



1. A magnetic disk comprising a glass substrate with an opening in a central portion, an undercoating film formed on said glass substrate, a magnetic recording film formed on said undercoating film, and a protective film formed on said magnetic recording film, wherein a texture is formed in a first region spaced apart from said opening by a predetermined distance, and a lubricant is coated on only said texture.

4,996,623

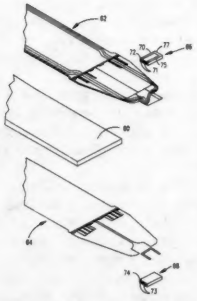
LAMINATED SUSPENSION FOR A NEGATIVE PRESSURE SLIDER IN A DATA RECORDING DISK FILE

A. David Erpelding; Darrell D. Palmer, and Richard K. Wilmer, all of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 7, 1989, Ser. No. 390,558

Int. Cl.[5] G11B *5/48*

U.S. Cl. 360—104 **13 Claims**



1. A suspension for use in a data recording disk file of the type having a disk with a data surface of concentric data tracks, means for rotating the disk about an axis generally

perpendicular to the disk, a transducer for writing data to or reading data from the data tracks, the transducer being attached to a negative pressure air-bearing slider maintained adjacent the data surface, means for actuating the slider generally radially relative to the disk so as to permit the transducer to access the data tracks, a support arm attached to the slider actuating means, and a suspension connecting the support arm to the slider, the suspension being a laminate structure comprising:

a flat, flexible sheet of nonconductive material, the sheet having an arm portion for attachment to the support arm, a slider portion for attachment to the slider, and a link portion connecting the arm portion and the slider portion;

a first metal layer secured to one side of the sheet, the first metal layer having an arm portion for attachment to the support arm and a link portion spaced from the arm portion so as to define a first hinge region of the flexible sheet; and

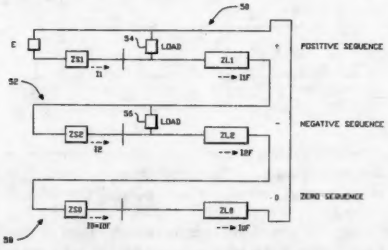
a second metal layer secured to the other side of the sheet, the second metal layer including electrical conductor portions extending from the arm portion of the sheet to the slider portion of the sheet for electrical connection to the transducer and a first hinge portion adjacent to and extending across the first hinge region of the sheet for providing a spring force to the slider, wherein a disk loading force is applied to the slider when the slider is attached to the slider portion of the sheet, the arm portions of the sheet and first metal layer are attached to the support arm, and the slider is positioned on a disk surface.

4,996,624

FAULT LOCATION METHOD FOR RADIAL TRANSMISSION AND DISTRIBUTION SYSTEMS

Edmund O. Schweitzer, III, Whitman County, Wash., assignor to Schweitzer Engineering Laboratories, Inc., Pullman, Wash.

Filed Sep. 28, 1989, Ser. No. 413,839
Int. Cl.[5] H02H *3/26*
U.S. Cl. 361—63 **4 Claims**



1. A method for determining the positive-sequence impedance to a fault comprising:

measuring the phase-to-ground voltage of the faulted line and the zero-sequence component of the fault current;

determining the residual current and

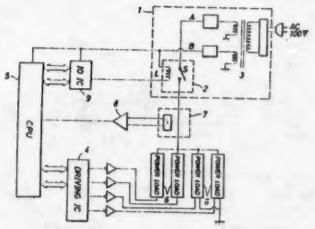
using the residual current (IR) and the residual current compensation factor (k) to determine the positive-sequence impedance by dividing said phase-to-ground voltage by $IR \times (1+k)$.

4,996,625

POWER SOURCE UNIT FOR IMAGE RECORDING APPARATUS

Utami Soma; Yasufumi Koseki, and Minoru Asakawa, all of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Aug. 30, 1989, Ser. No. 400,500
Claims priority, application Japan, Sep. 2, 1988, 63-220755
Int. Cl.[5] H02H *3/08*
U.S. Cl. 361—87 **6 Claims**



1. In an image recording apparatus having a central processing unit (CPU) which controls operation sequences of a load during respective operation cycles of the image recording apparatus, a power source unit for supplying power to the load, comprising:

means defining a power supply path to said load;

current sensing means which senses a load current;

current interrupting means connected to said power supply path for interrupting said power supply path;

means which stores in advance a plurality of predetermined current limit values at least one said value corresponding to each operation cycle to be performed by said image recording apparatus; and

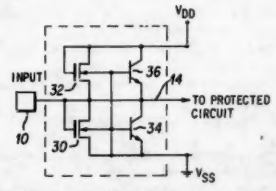
control means in said CPU operating said current interrupting means for interrupting said power supply path to said load when said CPU determines that the load current sensed by said current sensing means exceeds said predetermined current limit value for the corresponding operation cycle being performed by said image recording apparatus.

4,996,626

RESISTORLESS ELECTROSTATIC DISCHARGE PROTECTION DEVICE FOR HIGH SPEED INTEGRATED CIRCUITS

Quincy Say, Santa Clara, Calif., assignor to National Semiconductor Corp., Santa Clara, Calif.

Filed Oct. 14, 1988, Ser. No. 257,756
Int. Cl.[5] H01L *27/02*
U.S. Cl. 361—91 **11 Claims**



1. An electrostatic discharge protection circuit for an integrated circuit containing a signal line, supply line and ground line comprising:

first and second MOS transistors each with gate, drain and source terminals; wherein

said first MOS transistor gate and drain terminals are connected to said signal line, and said source terminal is connected to said ground line; and

said second MOS transistor gate and drain terminals are connected to said supply line, and said source terminal is connected to said signal line.

4,996,627

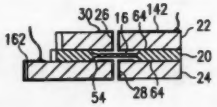
HIGH SENSITIVITY MINIATURE PRESSURE TRANSDUCER

Arthur R. Zias, Los Altos; Barry Block, Los Altos Hills; Kenneth W. Mapes, San Jose; Norman L. Nystrom, Sunnyvale, and Robert M. Cadwell, Los Altos, all of Calif., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Jan. 30, 1989, Ser. No. 304,344

Int. Cl.[5] H01G 7/00; G25F 3/12; B44C 1/22; H01L 29/84

U.S. Cl. 361—283 292 Claims



85. A transducer, comprising:

a conductive capacitor plate;

a semiconductor diaphragm defining a deflectable capacitor plate spaced apart from said fixed capacitor plate; and

a support structure encircling said semiconductor diaphragm and attached thereto for maintaining said deflectable diaphragm radially tensioned a predefined amount.

4,996,628

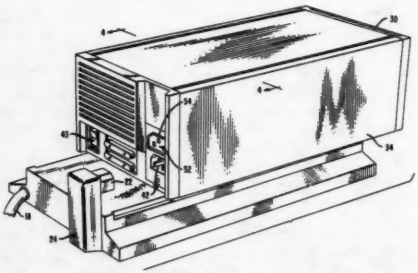
BASE FOR STACKABLE ASSEMBLIES

Robert T. Harvey, Wichita, Kans., and David C. White, Cincinnati, Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Oct. 19, 1989, Ser. No. 423,914

Int. Cl.[5] H05K 7/00

U.S. Cl. 361—393 9 Claims



1. An apparatus for switching a flow of AC power to an electronic assembly, comprising:

a base having a front face, rear face and a pedestal portion;

track means formed on said pedestal portion for slidably engaging an electronic assembly;

track means formed on said pedestal portion for slidably engaging an electronic assembly;

a first electronic assembly having means for slidably engaging said track means;

said slidably engaging means being engaged with said track means;

power input means attached to said base for receiving AC power from an external source;

a plug attached to said rear face for slidably engaging and electrically connecting said first electronic assembly to said base;

a switch attached to said front face for ON/OFF switching the flow of AC power from said power input means via said plug to said first electronic assembly; and

a second electronic assembly slidably engaged atop said first electronic assembly and electrically connected to said first electronic assembly for receiving AC power therefrom, such that said switch switches a flow of AC power to said second electronic assembly in the same manner that it switches the flow of AC power to said first electronic assembly.

4,996,629

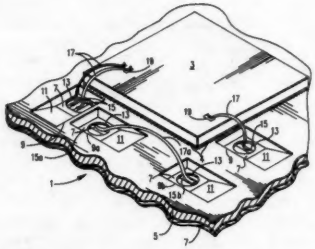
CIRCUIT BOARD WITH SELF-SUPPORTING CONNECTION BETWEEN SIDES

Robert A. Christiansen, Salvisa, and Joel A. DiGirolamo, Lexington, both of Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 14, 1988, Ser. No. 271,242

Int. Cl.[5] H05K 7/02

U.S. Cl. 361—400 22 Claims



1. A circuit board populated on opposite sides comprising a supporting layer having two sides and holes between said two sides, a conductive circuit pattern supported on one of said sides, said conductive circuit pattern crossing said holes and defining a bottom of each of said holes, circuit elements supported on the other of said sides and wires or other self-supporting conductors electrically connected to said circuit elements, extending through said holes, and bonded to said conductive pattern on the side of said conductive pattern facing said holes where said conductive pattern crosses said holes, and not extending past said bottom of said holes.

4,996,630

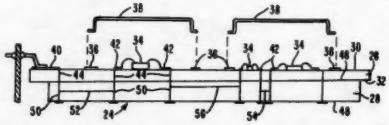
HYBRID MODULE ELECTRONICS PACKAGE

Ralph Liguori, Oakland; Kurt R. Goldhammer, West Milford, and Lothar Laermer, Paramus, all of N.J., assignors to Plessey Electronic Systems Corp., Wayne, N.J.

Filed Sep. 27, 1989, Ser. No. 413,432

Int. Cl.[5] H05K 1/11

U.S. Cl. 361—412 8 Claims



1. A hybrid module of electronic circuitry comprising:

a first substrate having hermetic properties, said first substrate having generally planar parallel first and second surfaces;

a plurality of electronic components mounted on the first surface of said first substrate, said plurality of components being grouped within discrete regions of said first surface;

enclosure means for providing a plurality of hermetic enclosures on said first surface, each of said hermetic enclosures surrounding the components within a respective discrete region;

a second substrate having organic properties, said second substrate having generally planar parallel first and second surfaces, the first surface of said second substrate being in

intimate contact with and electrically interconnected to the second surface of said first substrate; and

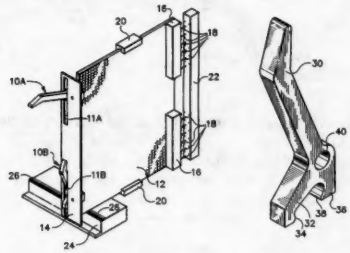
interconnection means for providing connections between said plurality of electronic components through said second substrate so that testing of said electronic components can be effected without invasion said hermetic enclosures.

4,996,631

INJECTOR/EJECTOR SYSTEM FOR RACK MOUNTED PLUG-IN MODULES WITH FRONT PANELS

Eugene G. Freehauf, Ontario, Calif., assignor to Canoga Industries, Inc., San Diego, Calif.

Filed Oct. 30, 1989, Ser. No. 428,860
Int. Cl.[5] H05K *7/14*
U.S. Cl. 361—415 **21 Claims**



1. A unit for injecting and ejecting a plug-in unit within a card cage having an ejection bearing surface and an injection member separate from the ejection bearing surface, said injection member having an injection bearing surface, the injecting-/ejecting unit comprising:

a handle portion adapted for operating the injecting/ejecting unit;

a pivot portion having an upper outward portion that is integrally connected to a lower inward portion of the handle portion, said pivot portion defining a configuration permitting interconnection of the pivot portion to the plug-in unit, and permitting pivotal movement of the handle portion about said interconnection to the plug-in unit;

an ejection finger extending from said lower outward portion of the pivot portion and integrally connected thereto, said ejection finger defining an ejecting surface on an inward end thereof for contacting the ejection bearing surface of the card cage during extraction of the plug-in unit from the card cage; and

an injection finger extending from said lower inward portion of the pivot portion that is separate from the lower outward portion of the pivot portion, and integrally connected to said lower outward portion, said injection finger defining an injecting surface on a lower end thereof for contacting the injection bearing surface of the card cage during insertion of the plug-in unit into the card cage, such that when said injecting/ejecting unit is used with the plug-in unit, said injecting/ejecting unit is positioned entirely adjacent a side of the plug-in unit that is opposite to a side upon which electronic components are secured.

4,996,632

MULTI-COLOR ILLUMINATING SYSTEM

Wallace R. Aikens, Plano, Tex., assignor to Gulton Industries, Inc., Plano, Tex.

Filed Oct. 7, 1988, Ser. No. 255,062
Int. Cl.[5] F21V *5/00*; G09F *13/00*
U.S. Cl. 362—32 **39 Claims**

1. An elongated light-producing arrangement comprising:

a light source for emitting light;

an elongated tube having a hollow interior, said tube having a light-transmissible portion extending along the length of said tube and extending only partially around the circumference of said tube, said tube also having a reflective surface for propagating light within and along the axis of the tube, said light source being arranged outside of said tube so as to expose said interior to the light emitted from said light source for reflection by said surface;

a diffusing medium arranged in said tube extending longitudinally and only partially around the circumference of

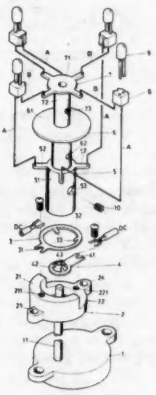
said tube, substantially diametrically opposite said light-transmissible portion, to diffuse light striking said diffusing medium both directly and by reflection from said reflective surface, said light-transmissible portion, said diffusing medium and said reflective surface in the aggregate extending over substantially the entire surface of said tube, whereby light in said tube impinging on said diffusing medium causes light from the diffusing medium to pass outwardly through said light-transmissible portion.

4,996,633

ROTARY TYPE CLOCK ORNAMENT LAMP CIRCUIT STRUCTURE

Wang C. Fu, 3th, Floor, No. 10 Alley 7, Lane 185, Sec. 3, Shing Long Road, Taipei, Taiwan

Filed May 14, 1990, Ser. No. 522,935
Int. Cl.[5] F21V *21/30*
U.S. Cl. 362—35 **3 Claims**



1. A rotary type clock ornament lamp circuit strcture, comprising:

a turner being a forward-acting or forward-backward type of motorized or electro-magnetic turning device, having a transmission shaft thereon;

a conductive seat being a circular cylinder having a higher vertical wall portion and a lower vertical wall portion, said higher vertical wall portion and said lower vertical wall portion having each a bolt hole on its topmost edge and an unitary lug at its outer side;

a positive pole conductive member being substantially a

copper ring having an unitary U-shaped projection transversely projecting outward and three projecting strips transversely projecting inward;

a negative pole conductive member being substantially a copper ring in size smaller than the copper ring of said positive pole conductive member and having an external projection and three internal projecting strips;

a positive pole distribution member comprising a cylindrical body having a distribution board on its top and a through-hole transversely through its periphery;

an insulator comprised of a cylindrical post having an expanded insulating board on its top and a through-hole transversely through its periphery;

a negative pole distribution member comprising a cylindrical body having a distribution board on its top and a bolt hole transversely through its periphery;

a plurality of sockets; and

a plurality of lamp bulbs being respectively mounted on said sockets by means of plug-in connection.

4,996,634

BUMPER REINFORCEMENT FOR AUTOMOTIVE VEHICLES

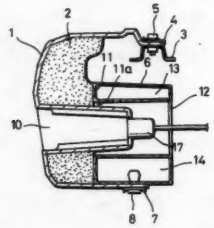
Shinichi Haneda, Aichi; Haruhiko Terada, Obu; Kazunari Azuchi, Himi, and Kiyohito Gyobu, Toyama, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha and Aisin Keikinzoku Kabushiki Kaisha, both of, Japan

Filed Mar. 30, 1990, Ser. No. 501,926

Claims priority, application Japan, Mar. 31, 1989, 1-36336[U]

Int. Cl.[5] B60Q *1/28*

U.S. Cl. 362—82 **3 Claims**



1. A vehicular bumper reinforcement for having a rear portion of a bumper shell mounting a lamp fixedly secured thereto, comprising:

a vertical front wall having a cut-out portion through which a mounting portion of the lamp is passed;

a vertical rear wall having a cut-out portion through which the lamp is capable of moving at the time of a collision; and

flanges provided above and below the cut-out portions and spaced apart from each other by a distance somewhat greater than the height of the lamp mounting portion; said flanges being connecting integrally both said walls,

at least one hollow portion formed integral with the reinforcement and provided above and below each of said flanges.

4,996,635

DEEP SUBMERSIBLE LIGHT ASSEMBLY WITH DRY PRESSURE DOME

Mark S. Olsson, San Diego; Samuel B. Parker, Venice, and Douglas G. Rimer, San Diego, all of Calif., assignors to Deepsea Power & Light, Inc., San Diego, Calif.

Filed Oct. 13, 1989, Ser. No. 420,909

Int. Cl.[5] F21V *29/00*

U.S. Cl. 362—267 **9 Claims**

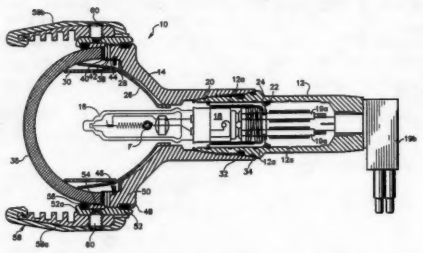
1. A deep submersible light assembly comprising:

a generally funnel-shaped main light body;

means for supporting a lamp inside a rear neck portion of the main light body including a socket assembly;

a dome-shaped lens sized to extend across a front flared portion of the main light body;

means including a plurality of rings for providing a watertight seal between a peripheral rear lip of the lens and a shoulder of the flared portion of the main light body;



a reflector mounted inside the flared portion of the main light body; and

a spring seated on an inner shoulder of the flared portion of the main light body and engaging the reflector to hold it in position.

4,996,636

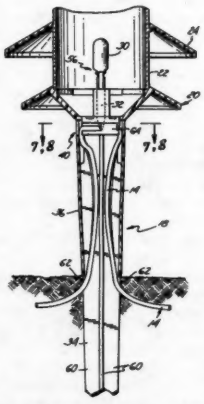
LOW VOLTAGE LIGHT FIXTURE

Robert H. Lovett, Eden Prairie, Minn., assignor to The Brinkmann Corporation, Dallas, Tex.

Filed Mar. 1, 1990, Ser. No. 486,966

Int. Cl.[5] F21S *1/10*

U.S. Cl. 362—431 **21 Claims**



1. In a low voltage light fixture for use with a multi-conductor wire, having a base, a lens supported by the base, a pair of electrical conductors supported by the base and forming a light bulb receptacle at upper ends and wire engaging prongs at lower ends, and having a support for supporting the base, the improvement comprising:

a first twist lock connector attached to a bottom surface of the base which includes a first pair of spaced connector elements, the first connector elements defining a first channel between them in which the wire is received and held and in which the prongs extend, and being positioned diagonally with respect to the first channel; and

a second twist lock connector attached to the upper end of the stake which includes a second pair of connector ele-

ments, the second pair of elements defining a second channel between them and positioned diagonally with respect to the second channel, wherein

(a) the second pair of spaced connector elements engage the first pair of spaced connector elements,

(b) a passage, through which the wire extends, is formed by the first and second channels and maintained, and

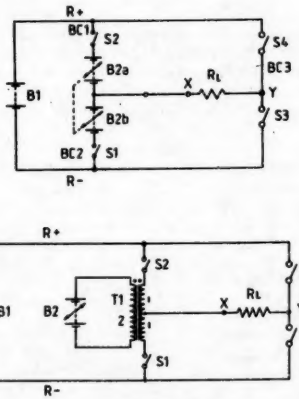
(c) the prongs electrically engage the wire, when the stake and base are rotated relative to one another.

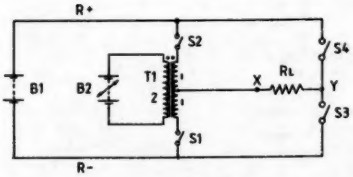
4,996,637

ELECTRICAL CONVERTER UTILIZING SWITCHED UNI-DIRECTIONAL AND BI-DIRECTIONAL ENERGY SOURCES

John J. Piechnick, Hazelwood Park, Australia, assignor to Power Reflex Pty. Ltd., The Levels, Australia

Filed Dec. 20, 1989, Ser. No. 453,510
Int. Cl.[5] H02M *3/335*
U.S. Cl. 363—16 **18 Claims**





1. A converter device comprising a uni-directional electrical energy source having two ends and a bi-directional energy source having two ends and a centre tap, a pair of conductor rails extending from the uni-directional energy source,

a first bridging conductor having two portions extending between said ends of the bi-directional energy source and respective said rails,

a second bridging conductor extending between the rails,

a first pair of switches one in each said first conductor portion,

a second pair of switches in the second bridging conductor portion,

an electrical load connected between the centre tap and an electrical conductor between the switches of the second pair,

so arranged that, upon selective opening and closing of the switches, current flow in the first said energy source is uni-directional, and in the second said energy source is bi-directional.

4,996,638

METHOD OF FEEDBACK REGULATING A FLYBACK POWER CONVERTER

Raymond K. Orr, Kanata, Canada, assignor to Northern Telecom Limited, Montreal, Canada

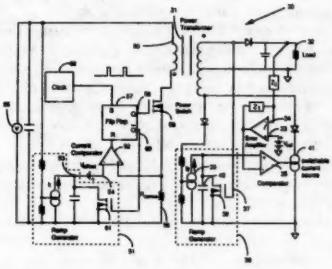
Filed Feb. 15, 1990, Ser. No. 480,392
Int. Cl.[5] H02M *3/335*
U.S. Cl. 363—21 **7 Claims**

1. In a flyback power converter, having a primary and a secondary, a method of regulating voltage at an isolated output load, comprising the steps of:

(a) comparing the voltage across said load with a reference to obtain an error signal;

(b) comparing said error signal with a ramp signal to obtain a perturbation signal which varies in time according to the amplitude of said error signal;

(c) feeding said perturbation signal to said secondary so that it becomes induced at said primary, said perturbation



signal being summed to the magnetizing current of said primary to provide a control signal when said primary is energized;

(d) detecting at the primary, the presence of said perturbation signal on said control signal; and

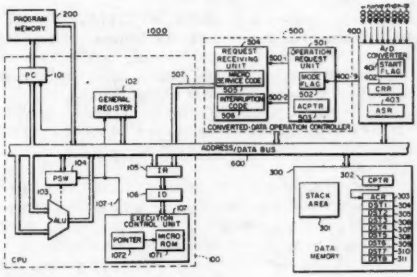
(e) regulating the voltage at said primary according to the presence in time of said perturbation signal on said control signal to thereby compensate for voltage variations at the output load.

4,996,639

DATA PROCESSOR INCLUDING AN A/D CONVERTER FOR CONVERTING A PLURALITY OF ANALOG INPUT CHANNELS INTO DIGITAL DATA

Satomi Ishimoto; Osamu Matsushima, and Hajime Sakuma, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Nov. 28, 1988, Ser. No. 276,970
Claims priority, application Japan, Nov. 27, 1987, 62-300614
Int. Cl.[5] G06F *5/00, 13/12*
U.S. Cl. 364—200 **9 Claims**



1. A data processor comprising:

(a) a program memory storing a program,

(b) a central processing unit including a program counter indicating an address of said program to be executed and a status register storing information representative of an execution state of said central processing unit and executing said program utilizing said program counter and said status register,

(c) an analog-to-digital converter supplied with a plurality of analog inputs and including

(1) first storage means for temporarily storing data for selecting one of said analog inputs,

(2) selecting means, coupled to said first storage means, for selecting one of said analog inputs in response to data stored in said first storage means,

(3) converting means, coupled to said selecting means, for converting a selected analog in[illegible] into digital data, and

(4) generating means, coupled to said converting means, for generating a completion signal representative of completion of analog-to-digital conversion,

(d) second storage means for temporarily storing designation data for designating one or more of said analog inputs to be converted, said designation data including a plurality of bits which respectively correspond to said analog inputs, [illegible]e or more bits corresponding to designated one or more analog inputs set to a first state and any remaining bits reset to a second state, and

(e) signal means, responsive to said completion signal, for supplying a macro service operation request to said central processing unit,

(f) said central processing unit further including execution means, responsive to said macro service operation request, for suspending execution of said program and for executing said macro service operation while holding a contents of said program counter and said status register unchanged without saving said contents and without accessing said program memory,

(g) said execution means including

(1) transfer means, operatively coupled to said converting means, for transferring said digital data to a predetermined designation area,

(2) detecting means, operatively coupled to said second storage means, for detecting a position of bits of said designation data which are set to said first state in and for producing selection data for selecting another one of said analog inputs, to be next converted, in accordance with a detected bit position,

(3) set means, operatively coupled to said first storage means, for setting said selection data into said first storage means to cause said analog-to-digital converter to convert another analog input into corresponding digital data, and

(4) release means for allowing said program counter and said status register to change such that said central processing unit resumes operation of said program.

4,996,640

DATA PROCESSING SYSTEM

Shiro Yamada, Kasugai; Keiichi Hirata, Kuwana; Minoru Oishi, Nagoya; Yoshinari Morimoto, Nagoya; Akihiro Furukawa, Nagoya, and Atsuko Kawasumi, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Oct. 21, 1987, Ser. No. 111,692

Claims priority, application Japan, Oct. 24, 1986, 61-254323

Int. Cl.[5] G06F *3/14*

U.S. Cl. 364—200 **21 Claims**

1. A data processing system having a plurality of data processing operation modes and a text memory for storing a plurality of data files comprising:

mode select means for selecting an operation mode;

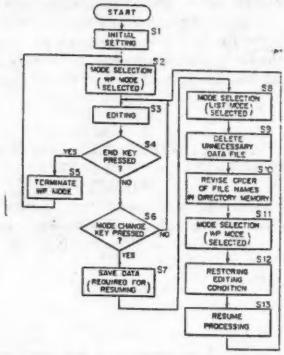
mode changing means for interrupting a processing being executed under a data input/edit mode and changing modes to enable processing in a selected mode;

data memory means for saving required data to permit the interrupted processing to continue in said data input/edit mode at the point of interruption, said data memory means comprising:

a data file name memory for saving a data file name of a currently processed data file under said data input/edit mode;

a start address memory for saving a start address of said currently processed data file in said text memory, and

an edit condition memory for saving editing conditions being executed under said data input/edit mode; and



resuming means for resuming the interrupted processing in said data input/edit mode based upon said data saved in said data memory means when said data input/edit mode is reselected by said mode select means after said processing executed under said selected mode.

4,996,641

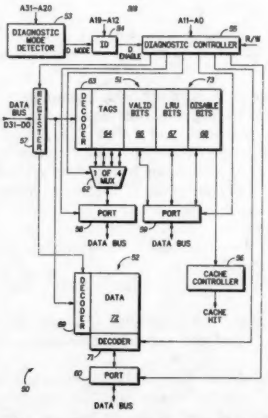
DIAGNOSTIC MODE FOR A CACHE

Yoav Talgam, Tel-Aviv, Israel; Paul A. Reed, Austin, Tex.; Elie Haddad, Austin, Tex., and James A. Klingshirn, Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 15, 1988, Ser. No. 181,856

Int. Cl.[5] G06F *11/10, 11/22*

U.S. Cl. 364—200 **6 Claims**



1. A cache having an address bus for receiving addresses from a processor requesting data, and a data bus for providing requested data to the processor, comprising:

a TAG memory, coupled to the address bus, having a plurality of valid bits, a plurality of disable bits, and a plurality of TAG locations for storing a plurality of TAG addresses, each TAG location having a valid bit of the plurality of valid bits and a disable bit of the plurality of disable bits associated therewith;

a data memory, coupled to the data bus, having a plurality of storage locations for storing data, wherein said stored data may be invalid and wherein said storage locations may be

defective, each storage location corresponding to a TAG location of the plurality of TAG locations, a valid bit of the plurality of valid bits for indicating if data stored in the storage location is invalid, and a disable bit of the plurality of disable bits for indicating if the storage location is defective;

TAG memory decoder means for selecting a first subset of TAG locations and disable bits which correspond thereto in response to a first portion of the address provided onto the address bus;

register means. coupled to the data bus and the TAG memory decoder, for storing information received from said data bus and selecting the first subset of TAG locations; and

control-bit port means, coupled to the disable bits and the data bus, for coupling the disable bits which correspond to the first subset of TAG locations to the data bus.

4,996,642

SYSTEM AND METHOD FOR RECOMMENDING ITEMS

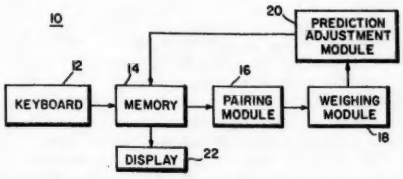
John B. Hey, Concord, Mass., assignor to Neonics, Inc., Concord, Mass.

Continuation-in-part of Ser. No. 103,848, Oct. 1, 1987, Pat. No. 4,870,579. This application Sep. 25, 1989, Ser. No. 411,857

The portion of the term of this patent subsequent to Sep. 26, 2006, has been disclaimed.

Int. Cl.[5] G09B *19/00;* **A63F** *9/18*

U.S. Cl. 364—419 **28 Claims**



1. A method of selectively recommending, for a user selected from a group of users, items sampled by one or more users in the group but not sampled by the selected user, the recommendations being based on other items previously sampled by that user and on the availability of the items from a source, the method comprising:

defining, for each item sampled by the selected user, a scalar rating representing the reaction of the selected user to that item;

successively pairing the selected user with other users in the group for whom have been defined scalar ratings for at least some of the items sampled by the selected user to determine the difference in ratings for items sampled by both members of that pair, and generating for each pair an agreement scalar representing the overall rating agreement between the members of each successive pair;

designating a plurality of the other users as recommending users and converting, for each of the recommending users, the agreement scalar into a weighting value;

applying the weighting values to items not yet sampled by the selected user to proportionally alter the difference between a rating previously established for each item not yet sampled by the selected user and the ratings of that item by the recommending users to adjust the recommendations for the selected user to more closely anticipate the actual reaction of the user to that item; and

selecting at least one item to be presented to the selected user based on a predetermined criterion and on the availability of the item from the source.

4,996,643

DIAGNOSIS SYSTEM FOR A MOTOR VEHICLE

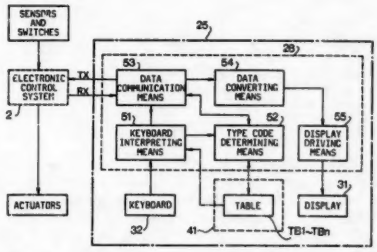
Masanori Sakamoto; Kunihiro Abe, and Tomoya Kobayashi, all of Tokyo, Japan, assignors to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 2, 1989, Ser. No. 306,892

Claims priority, application Japan, Feb. 18, 1988, 63-036422

Int. Cl.[5] G01M *15/00;* **F02D** *41/26;* **F02P** *17/00*

U.S. Cl. 364—424.03 **5 Claims**



1. In a diagnosis system for an electronic control system mounted on a motor vehicle having sensing means for detecting operating conditions of the vehicle and for producing input data, and means for storing an identification code corresponding to type of the vehicle and for storing the input data from said sensing means and for providing control data for controlling the vehicle, the diagnosis system being responsive to at least one of said data for diagnosing said at least one of said data and for providing diagnosis data, the diagnosis system comprising display means for displaying said diagnosis data, and a keyboard for inputting a code into said diagnosis system and for producing a corresponding code signal, a detachable memory cartridge detachably connected to said diagnosis system for storing a plurality of programs to diagnose said at least one data, connecting means for connecting said diagnosis system with said electronic control system and said detachable memory cartridge which have different types of data signals being transmitted in response to a demand signal, the improvement in the diagnosis system which comprises:

data converting means responsive to said diagnosis data for converting said diagnosis data and for producing a corresponding driving signal for display of the converted diagnosis data on said display means;

keyboard interpreting means responsive to the code signal corresponding to a vehicle type code inputted into said keyboard for generating a corresponding type code signal; and

type code determining means responsive to said type code signal and said identification code, respectively, for retrieving a corresponding of said programs for the diagnosing.

4,996,644

AIR-FUEL RATIO CONTROL SYSTEM FOR USE IN INTERNAL COMBUSTION ENGINE

Hiroshi Fukuchi, Kyoto; Mitsuaki Ishii, and Masaaki Miyazaki, both of Hyogo, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 146,943, Jan. 22, 1988, abandoned. This application Aug. 14, 1989, Ser. No. 393,869

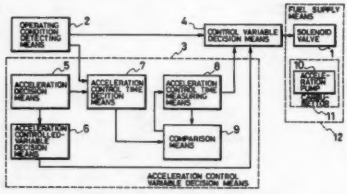
Claims priority, application Japan, Jan. 22, 1987, 62-12775; Jan. 22, 1987, 62-12776

Int. Cl.[5] F02M *7/00*

U.S. Cl. 364—431.05 **6 Claims**

1. An air-fuel ratio control system for use in an internal combustion engine, said system comprising fuel supply means equipped with a carburetor incorporating an acceleration pump for supplying fuel to said internal combustion engine and at least one duty-controlled solenoid valve for supplying fuel

to said internal combustion engine and being adapted to control the air-fuel ratio; operating condition detecting means for detecting an operating condition of said internal combustion engine; acceleration control variable decision means for detecting an acceleration condition of said internal combustion engine, and for setting a predetermined acceleration controlled-variable for said solenoid valve during different acceleration control times determined in accordance with the detected operating condition and the detected acceleration condition; and controlled variable decision means for determining the controlled duty of said solenoid valve according to data from said operating condition detecting means and when a controlled variable is given by said acceleration control variable decision means at the time of acceleration, according to the acceleration controlled-variable.



4,996,645

VEHICLE NAVIGATION DEVICE WITH REPRODUCTION OF A SELECTED MAP ELEMENT ACCORDING TO A PREDETERMINED REPRESENTATION STANDARD

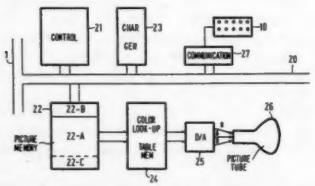
Ingrid A. C. Schneyderberg Van Der Zon, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 2, 1988, Ser. No. 239,890

Claims priority, application Netherlands, Sep. 4, 1987, 8702087

Int. Cl.[5] G08G *1/0969*

U.S. Cl. 364—449 **18 Claims**



1. A vehicle navigation device comprising:

(a) a storage memory for storing road map data;

(b) a character generator;

(c) a reproduction unit having:

(i) a picture memory; and

(ii) a display screen for displaying maps in color and having an input coupled with the picture memory;

(d) a map element selector for selecting map elements from the road map data;

(e) a control unit, including a picture composition unit for:

(i) loading a road map selected from the road map data into the picture memory, in response to the map element selector, which selected road map represents an area around a selected map element;

(ii) loading a name, generated for the selected map element by the character generator, into a predetermined segment of the picture memory;

(iii) superposing a pattern, within at least one first shape which corresponds to a shape of the selected map element, for display according to a predetermined representation standard, on data which represents the selected map element, which predetermined representation standard is distinct from standards used for displaying other map elements; and

(iv) superposing the pattern, within at least one second shape which corresponds to a shape of either the segment or the generated name, for display according to the predetermined representation standard, on data which represents either the segment or the generated name.

4,996,646

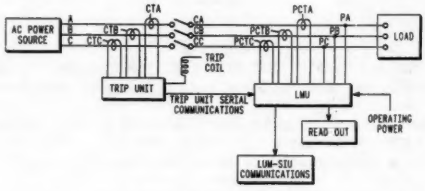
MICROPROCESSOR-CONTROLLED CIRCUIT BREAKER AND SYSTEM

Ronald L. Farrington, Cedar Rapids, Iowa, assignor to Square D Company, Palatine, Ill.

Filed Mar. 31, 1988, Ser. No. 175,992

Int. Cl.[5] G06F *15/56;* **G01R** *19/00*

U.S. Cl. 364—483 **17 Claims**



1. A tripping system for interrupting electric current flowing through at least one conductor from a source of electrical energy to a load, comprising:

a tripping unit having

a current sensor for measuring the current, and

processing means, responsive to the current sensor, for disconnecting the load from the source if the measured current exceeds a predetermined threshold and for transmitting data representing the status of the tripping unit,

said processing means including means for dividing data to be transmitted into a more critical data set and a less critical data set and for transmitting said more critical data set more frequently than said less critical data set;

a data path, coupled to the tripping unit, for carrying the transmitted data from the tripping unit; and

a peripheral device, coupled to the data path, for receiving the data transmitted by the tripping unit.

4,996,647

DIGITAL STATISTICAL PROCESSING FOR SIGNAL PARAMETER DETERMINATION

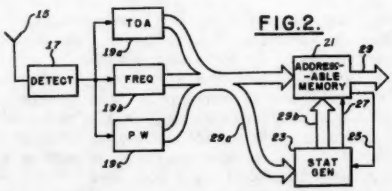
Ernest S. Gasser, Earlysville, Va., assignor to Sperry Marine Inc., Charlottesville, Va.

Filed Mar. 27, 1989, Ser. No. 328,843

Int. Cl.[5] G06F *15/20*

U.S. Cl. 364—484 **8 Claims**

FIG.2.



1. An apparatus for determining parameters of a received signal, the parameters including time of arrival, pulse width, and frequency comprising:

means for providing parameter representative signals for said received signal;

comparing means coupled to receive said parameter representative signals of said received signal for comparing said parameter representative signals to respective upper threshold signals and respective lower threshold signals and for providing said parameter representative signals of said received signal when all said parameter representative signals of said received signal are less than said respective upper threshold signals and greater than said respective lower threshold signals; and

processing means enabled by said comparing means to receive said parameter representative signals of said received signal when all said parameter representative signals of said received signals are bounded by said respective upper and lower threshold signals for processing said parameter representative signals of said received signal with previously received parameter representative signals of said received signal to establish statistical parameters and for adjusting said upper and lower threshold signals in accordance with said statistical parameters.

4,996,648

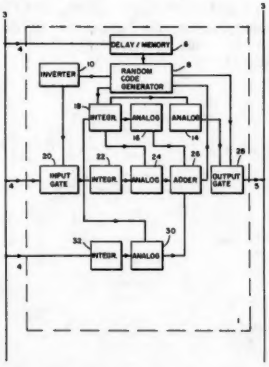
NEURAL NETWORK USING RANDOM BINARY CODE

Alexander N. Jourjine, P.O. Box 425, Cambridge, Mass. 02142

Filed Oct. 27, 1987, Ser. No. 113,636

Int. Cl.[5] G11C *27/00*; G06F *13/00*; H03K *19/08*

U.S. Cl. 364—513 **7 Claims**



1. A method of analog, parallel hardware implementation of neural networks with changeable connectivity pattern and changeable long term memory traces comprising:

arranging a plurality of processors into a two dimensional array comprising:

linear arrays of processors; pipeline buses common to one or more of said linear arrays; means for access of input signals; means for retrieval of output signals; means for access of control signals to each processor;

arranging said processors of said linear arrays to absorb and to emit energy in the form of modulated energy emissions from and into one or more pipeline buses common to at least a part of said linear arrays, binary modulation of energy emissions depending on analog characteristics of absorbed energy;

arranging advantageous delay and duration of activation of a random code generator, said binary modulation being a function of a random output from the random code generator;

using averages of the binary codes of said processors' energy emissions as short term memory traces of a neural network;

using the ratios of second correlations of pairs of codes to the products of their averages as long term memory traces of a neural network.

4,996,649

IMAGE PROCESSOR CAPABLE OF STORING CHARACTER IMAGES AND GRAPHIC IMAGES IN A MEMORY AND INCLUDING A TIMER FOR ENSURING IMAGE PROCESSING OPERATIONS ARE CARRIED OUT IN A PREDETERMINED TIME PERIOD

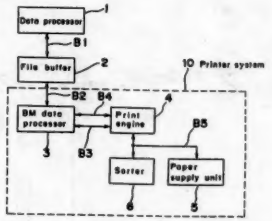
Nobuo Kamei, and Yoshikazu Ikenoue, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 10, 1988, Ser. No. 230,482

Claims priority, application Japan, Aug. 11, 1987, 62-200308; Sep. 11, 1987, 62-228875

Int. Cl.[5] G06F *15/20*

U.S. Cl. 364—518 **8 Claims**



1. An image processor which receives data indicating particular characters and/or graphic patterns and which converts the data into bit images of actual dot patterns to be outputted to an external apparatus, comprising:

memory means for storing said bit images;

imaging means for conducting an imaging operation in which the received data is converted into bit images and for writing the converted bit images into said memory means;

timer means for clocking a predetermined time period from a time when said imaging operation is started; and

control means for forcibly stopping the imaging operation of said imaging means if the imaging operation has not yet been completed at a time when said timer means reaches or exceeds said predetermined time period.

4,996,650

PRINT CONTROL SYSTEM

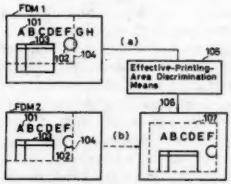
Nobumitsu Kenbo, Hadano, Japan, assignor to Hitachi Ltd., Tokyo, Japan

Filed Aug. 23, 1989, Ser. No. 397,198

Claims priority, application Japan, Sep. 12, 1988, 63-227687

Int. Cl.[5] G06K *15/00*

U.S. Cl. 364—519 **12 Claims**



1. A print control system in which an object to be printed is developed in the form of dots on a full-dot memory having an area corresponding to a maximum size of printing paper to provide data in the form of dots and the data read out in a serial form from the full-dot memory are transmitted to a printing

section, allowing the data to be printed on different size of printing paper, comprising:

means for discriminating data read out from the full-dot memory by determining whether the position of the data being printed is within an effective printing area set according to the size of the printing paper or not; and

means for inhibiting the read out data from being transmitted to the printing section whose position is determined as being out of the effective printing area.

4,996,651

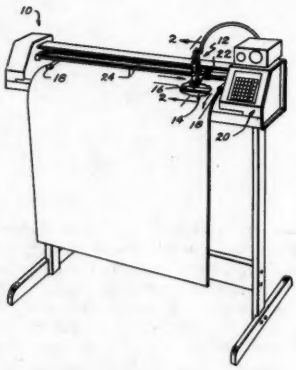
CUTTING INSTRUMENT IMPROVEMENT FOR X-Y PLOTTER

William L. Wells, 1208 Fleming Rd., Cordele, Ga. 31015

Filed Dec. 22, 1989, Ser. No. 454,980

Int. Cl.[5] G06F *15/00*

U.S. Cl. 364—520 **29 Claims**



1. In a computer controlled X-Y plotter including means for detachably receiving and controlling a laminated sheet including a layer of display material adhered to a layer of release material, an instrument carrying member having means for detachably receiving and holding an instrument thereon in fixed centered relation, a carriage having means for mounting said instrument carrying member thereon (1) for biased movement into an operative position wherein an instrument received and held in fixed centered relation by said instrument receiving and holding means is disposed in operative relation with a laminated sheet received and controlled by said laminated sheet receiving and controlling means and (2) for controlled movement from said operative position against the bias thereof into an inoperative position wherein an instrument received and held by said instrument receiving and holding means is disposed in spaced relation with a laminated sheet received and controlled by said laminated sheet receiving and controlling means, and means for mounting said laminated sheet receiving and controlling means and said carriage for relative movements with respect to each other such that relative movements along both an X axis and a Y axis can be effected between an instrument received and held in fixed centered relation by said instrument receiving and holding means and a laminated sheet received and controlled by said sheet receiving and controlling means with the instrument carrying member either in an operative or inoperative position, the improvement which comprises

an electric motor having a housing,

a rotor mounted in said housing for rotation about an axis fixed with respect to said housing at a relatively high speed in response to the connection of said motor with a source of electric current,

means on said motor housing for cooperating with said instrument receiving and holding means to enable the latter to hold said motor housing in fixed centered relation on said instrument carrying member for controlled movement with said instrument carrying member into said inoperative position and biased movement with said instrument carrying member into said operative position,

a cutting tool detachably fixed to said rotor for rotation therewith and having a sharp point disposed on said rotational axis when said instrument carrying member is in said operative position for relative X and Y axis movements with respect to a laminated sheet received and controlled by said laminated sheet receiving and controlling means, and

adjustable spring means acting between said motor housing and said carriage for resiliently supporting a selected portion of the weight of said electric motor and cutting tool on said carriage in such a way as to accommodate the controlled movement of said electric motor and cutting tool with said instrument carrying member into said inoperative position and (2) facilitate the biased movement of said electric motor and cutting tool with said instrument carrying member into said operative position so as to enable said cutting tool to cut the layer of display material during relative X and Y axis movements without severing the layer of release material.

4,996,652

SYSTEM FOR DISPLAYING IMAGE OF EXTENDED AREA

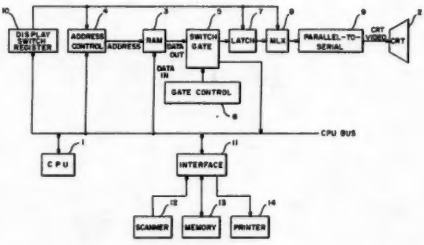
Toshiya Morita; Sumio Kita, and Hiroshi Kamada, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 22, 1988, Ser. No. 185,144

Claims priority, application Japan, Apr. 22, 1988, 62-100862

Int. Cl.[5] G06F *15/20*

U.S. Cl. 364—521 **6 Claims**



1. A display system comprising

memory means for sequentially storing an original image to be displayed as image data at addresses corresponding to positions in horizontal line and vertical column directions,

retrieving means which serves to retrieve selectably every Mth line of said image data, M being an integer greater than or equal to 1,

converting means for sequentially and temporarily storing those of said image data retrieved in units of lines by said retrieving means, said converting means serving to convert said retrieved image data into serial data by extracting selectably every Nth one of said retrieved image data sequentially so as to generate a serial video signal for a reduced display, N being also an integer greater than or equal to 1 such that a display of an extended area of said original image can be effected, said converting means including a latch circuit for temporarily storing said image data and a multiplexer for selecting according to a display switch signal a plurality of said image data temporarily stored in said latch circuit,

a display device for receiving and displaying said serial data, and

a display switch register for storing and transmitting said

display switch signal to said latch circuit and to said multiplexer.

4,996,653

LINE GENERATION IN A DISPLAY SYSTEM

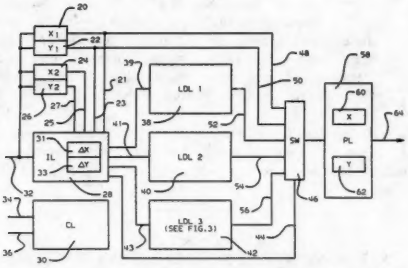
Nicholas D. Butler, Romsey; Adrian C. Gay, Fareham, both of United Kingdom, and Jack E. Bresenham, Chapel Hill, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 28, 1987, Ser. No. 138,241

Claims priority, application United Kingdom, Jul. 30, 1987, 8718074

Int. Cl.[5] G06F *15/20*

U.S. Cl. 364—521 **17 Claims**



1. A line generator for determining the individual pixels to be plotted for a line to be drawn on a display device in a display system, said display device having a plurality of discrete display points ("pixels") that are drawn by being illuminated in response to electrical control signals, said line generator comprising:

line definition means for determining pixels to plot, said line definition means including:

(a) a line definition table having a plurality of discrete entries representing a set of lines, in each of which is stored a coded representation of a respective one of said set of lines, the coded representation of each individual line comprising a series of data items representing transitions between adjacent pixels to be plotted for drawing said individual line;

(b) address logic for accessing an appropriate entry in the line definition table for the coded representation of a line to be drawn in response to a line drawing order; and

means for generating electrical control signals for causing pixels to be drawn on said display device, said electrical control signals generated in response to said coded representation of said line to be drawn.

4,996,654

METHOD OF DISPLAYING ACQUIRED DATA

Barry L. Rosenow, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Dec. 22, 1988, Ser. No. 289,660

Int. Cl.[5] G06F *15/74, 15/00*

U.S. Cl. 364—521 **4 Claims**

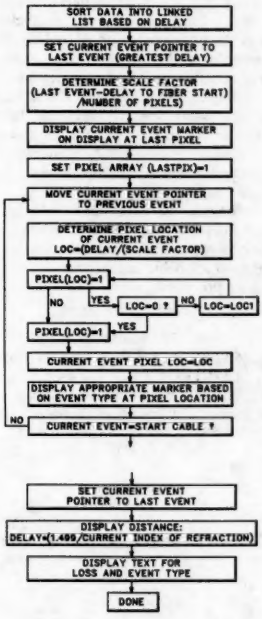
1. An improved method of displaying optical time domain reflectometry data wherein the data represents events occurring within a fiber under test with each event having a type of event component, a delay time component, and a signal loss component, the steps comprising:

determining a total time delay between a start event and and end event for calculating a scale factor for a full screen base line display, the scale factor being a function of the total time delay and length of the base line display;

determining a location on the full screen base line display for a first event using the delay time component for the first event and the calculated scale factor;

determining a location on the full screen base line display for a second event using the delay time component for the second event and the calculated scale factor;

offsetting the second event location from the first event location if the locations coincide on the display; and


SORT DATA INTO LINKED LIST BASED ON DELAY
SET CURRENT EVENT POINTER TO LAST EVENT (GREATEST DELAY)
DETERMINE SCALE FACTOR (LAST EVENT-DELAY TO FIBER START) /NUMBER OF PIXELS)
DISPLAY CURRENT EVENT MARKER ON DISPLAY AT LAST PIXEL
SET PIXEL ARRAY (LASTPIX)=1
MOVE CURRENT EVENT POINTER TO PREVIOUS EVENT
DETERMINE PIXEL LOCATION OF CURRENT EVENT LOC=(DELAY/(SCALE FACTOR)
PIXEL(LOC)=1
NO
YES
LOC=0 ?
NO
LOC=LOC1
PIXEL(LOC)=1
YES
CURRENT EVENT PIXEL LOC=LOC
DISPLAY APPROPRIATE MARKER BASED ON EVENT TYPE AT PIXEL LOCATION
NO
CURRENT EVENT=START CABLE ?
SET CURRENT EVENT POINTER TO LAST EVENT
DISPLAY DISTANCE: DELAY=(1.465/CURRENT INDEX OF REFRACTION)
DISPLAY TEXT FOR LOSS AND EVENT TYPE
DONE

displaying at the determined event locations on the full screen base line display a graphical symbol representative of the type of event component for each event.

4,996,655

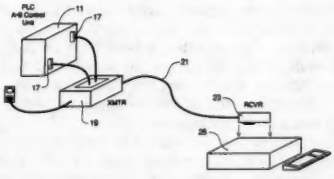
REAL TIME MONITORING OF REMOTE SIGNALS IN AN INDUSTRIAL ENVIRONMENT

Gary L. Chadwick, and Joe F. Johnson, both of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Filed Feb. 16, 1989, Ser. No. 312,595

Int. Cl.[5] G05B *23/00*

U.S. Cl. 364—550 **24 Claims**



1. An apparatus for sampling signal timing states of equipment which has a signal output of operational states, and the signal output occurs in a substantially real time relationship to the operational states, comprising:

(a) a monitor interface for monitoring the signal output of the operational states and providing signals representative of the operational states;

(b) the monitor being electrically isolated from signals on the

equipment which are being monitored and requiring no extra strobes or setup data from the equipment;

(c) a data latch for receiving the signals representative of the operational states in a parallel format and transmitting a latched output in response to a latch enable signal;

(d) a serial transmitter receiving signals from the data latch and providing corresponding signals in a serial format;

(e) timing and control circuitry for controlling a timing sequence of the latch enable signal and the receipt by the serial transmitter of the signals;

(f) a receiver circuit connected to a computer processing unit and having a data register which is addressable by the computer processing unit, wherein said receiver circuit receives the signals in the serial format and provides signals representative of said signal output of the operational states in a format which may be addressed by the computer processing unit; and

(g) means to clock the receipt by the serial transmitter of the signals and for providing signals of said signal output of the operational states in the computer addressable format, the means to clock being independent of a clock speed of the computer processing unit.

4,996,656

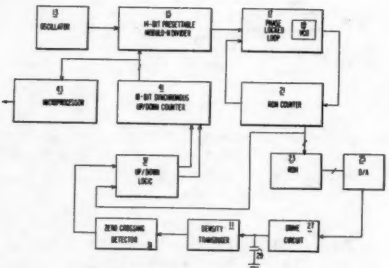
DENSITOMETER WITH REMOTELY DISPOSED CONTROL ELECTRONICS

Geoffrey S. M. Hedrick, Malvern, Pa., assignor to Innovative Solutions & Support, Incorporated, Malvern, Pa.

Filed Sep. 2, 1988, Ser. No. 241,017

Int. Cl.[5] G01N *9/00*

U.S. Cl. 364—558 **9 Claims**



9. A densitometer, comprising:

a vibrating cylinder type density transducer, designed for immersion in a liquid, having input means for receiving an excitation signal and output means for generating a pick-up signal responsive to the excitation signal and to the density of the liquid; and

excitation and measurement electronics coupled to the density transducer, comprising:

an oscillator for generating a pulse train output;

a modulo-N divider having two inputs and one output, one said input receiving the pulse train output of the oscillator and the other said input receiving a signal from an up/down counter;

a phase locked loop including a voltage controlled oscillator, having an output coupled to a read-only memory counter and an input coupled to the output of the modulo-N divider, the read-only memory counter having one input and two outputs;

a read-only memory having an input coupled to an output of the read-only memory counter;

a digital-to-analog converter having an input coupled to the output of the read-only memory;

a drive circuit having an input coupled to the output of the digital-to-analog converter, and having an output coupled to the input of the density transducer, the drive circuit being arranged to provide an excitation signal to the density transducer;

a zero crossing detector having an input coupled to the output of the density transducer and arranged to receive said pick-up signal from the density transducer, and having an output coupled to one input of an up/down logic circuit, a second input of the up/down logic circuit being coupled to one of the outputs of the read-only memory counter, the up/down circuit further having two outputs; and

an up/down counter having two inputs coupled to the outputs of the up/down logic circuit and having two outputs, one of which outputs is coupled to the input of the modulo-N divider and the other of which outputs is coupled to an input of a programmed microprocessor;

the excitation and measurement electronics serving to provide an excitation signal to the density transducer and to measure the pick-up signal of the density transducer so as to maintain the density transducer in resonance, and to generate a signal corresponding to the frequency of resonance of the density transducer, which signal frequency is indicative of the density of the liquid;

whereby the densitometer is capable of accurately measuring fluid density despite wide physical separation between the density transducer and the excitation and measurement electronics.

4,996,657

STEERING ANGLE DETECTING SYSTEM FOR AUTOMOTIVE VEHICLES

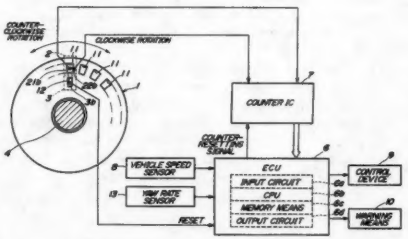
Shuji Shiraishi; Takashi Nishihara; Hironobu Kiryu, and Naoki Omomo, all of Wako, Japan, assignors to Honda Giken Kogyo K.K., Tokyo, Japan

Filed Mar. 15, 1989, Ser. No. 324,234

Claims priority, application Japan, Mar. 18, 1988, 63-36116[U]; Mar. 18, 1988, 63-36117[U]; Mar. 18, 1988, 63-36118[U]

Int. Cl.[5] G06F *15/50, 11/00*

U.S. Cl. 364—559 **12 Claims**



1. A steering angle detecting system for a vehicle having a steering member, comprising:

angular pulse generating means responsive to rotation of said steering member for generating angular pulses corresponding in number to a steering angle by which said steering member has been operated;

reference pulse generating means for generating a predetermined reference pulse at a predetermined angle of said steering member;

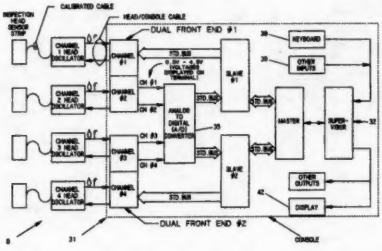
a counter for counting said angular pulses from said angular pulse generating means and generating a counted value output representing said steering angle; and

abnormality determining means connected with said reference pulse generating means and said counter output for determining that said steering angle detecting system is abnormal when the counted value generated by said counter is not within a predetermined value range when said predetermined reference pulse is generated.

4,996,658
SELF-CALIBRATING GLASS CONTAINER INSPECTION MACHINE

Russ J. Baker, Horseheads, N.Y., assignor to Emhart Industries, Inc., Towson, Md.

Filed Aug. 31, 1989, Ser. No. 401,105
Int. Cl.[5] G01R *35/00*; G06G *15/46*; B07C *5/00*
U.S. Cl. 364—571.04 **3 Claims**



1. A glass container inspection machine comprising

sensing means for providing a voltage signal representative of the thickness of the wall of a glass container,

means for presenting a glass container to said sensing means,

means for storing at least two voltage signals provided by said sensing means representative of the thickness of the wall of the glass container at at least two selected locations,

means for inputting the actual thickness of the wall of the sensed container corresponding to each of said at least two selected locations, and

calibration means for equating said at least two voltage signals with said inputted corresponding actual thicknesses and for generating a curve representing actual thickness as a function of sensed voltage.

4,996,659
METHOD OF DIAGNOSING INTEGRATED LOGIC CIRCUIT

Noboru Yamaguchi, Higashiyamato; Hideo Nakamura, Tokyo; Yoshimune Hagiwara; Tsukasa Sato, both of Hachioji, and Haruo Koizumi, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 12, 1987, Ser. No. 84,153
Claims priority, application Japan, Aug. 20, 1986, 61-192884; Sep. 19, 1986, 61-219169
Int. Cl.[5] G01R *31/28*
U.S. Cl. 364—579 **6 Claims**

2. A method of diagnosing an integrated logic circuit, comprising the steps of:

(a) detecting a train of logical values of an output signal appearing at a predetermined measuring point within said integrated logic circuit by the use of a contactless probing device;

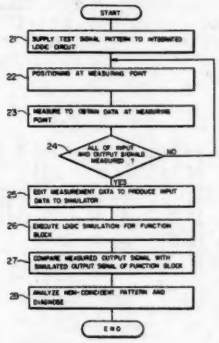
(b) detecting a faulty signal by comparing a train of logical values of an expected output signal, at said predetermined measuring point, derived by logic simulation of said integrated logic circuit, with said detected train of logical values of said output signal;

(c) finding an input signal supplied to a function block delivering said faulty signal, by referring to a file of logic connection information;

(d) positioning a measuring point at a location of said found input signal;

(e) detecting a train of logical values of a signal at said location by use of said contactless probing device;

(f) detecting another faulty signal by comparing a train of logical values of an expected signal, at said location, derived by logic simulation, with said detected train of logical values of said signal;


START
SUPPLY TEST SIGNAL PATTERN TO INTERNAL LOGIC CIRCUIT
POSITIONING AT MEASURING POINT
MEASURE TO OBTAIN DATA AT MEASURING POINT
ALL OF INPUT AND OUTPUT SIGNALS MEASURED ?
NO
YES
EDIT MEASUREMENT DATA TO PRODUCE INPUT DATA TO SIMULATOR
EXECUTE LOGIC SIMULATION FOR FUNCTION BLOCK
COMPARE MEASURED OUTPUT SIGNAL WITH SIMULATED OUTPUT SIGNAL OF FUNCTION BLOCK
ANALYZE NON-COINCIDENT PATTERN AND DIAGNOSE
END

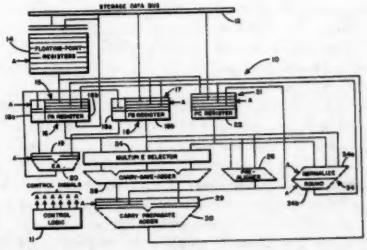
(g) finding a function block whose output signal is faulty and whose input signal is not faulty by repeating steps (c)–(f); and

(h) determining that said detected function block is faulty.

4,996,660
SELECTION OF DIVISOR MULTIPLIERS IN A FLOATING POINT DIVIDE CIRCUIT

Thomas J. Beacom, Pine Island, and Donald L. Freerksen, Rochester, both of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 17, 1989, Ser. No. 339,268
Int. Cl.[5] G06F *7/38*
U.S. Cl. 364—748 **4 Claims**



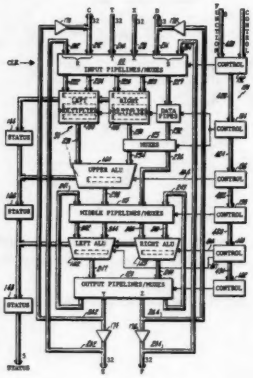
1. In a floating point divide circuit of the type using a 2-bit, non-restoring division method, the improvement comprising a multiplier selection circuit having means for selecting a divisor multiple as a function of the most significant bits of the divisor and dividend, said multiplier selection circuit further comprising a semiconductor circuit having a selectable matrix of signals representative of possible divisor multipliers, none of said divisor multipliers being equal to three-fourths the value of the dividend divided by the divisor for all values of dividend and divisor within the range of most significant bits of interest.

4,996,661

SINGLE CHIP COMPLEX FLOATING POINT NUMERIC PROCESSOR

Roger G. Cox; Michael W. Yeager, both of Colorado Springs, and Lance L. Flake, Boulder, all of Colo., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 5, 1988, Ser. No. 253,826
Int. Cl.[5] G06F *7/38, 15/40, 15/00*
U.S. Cl. 364—748 15 Claims



1. An integrated circuit for processing floating point numbers and having a pipelined data structure in which data passes sequentially in a series of pipeline cycles having a latency of a predetermined number of circuit clock cycles through a set of processing stages in one of a set of predetermined controllably selected data paths and is manipulated under sequentially decoded control from a set of control registers containing stored control data and corresponding to said set of processing stages and comprising;

an input section including a first set of registers and multiplexers for connecting at least two of at least four data input/output means to input ports of two multipliers that are connected in parallel to said first set of registers and multiplexers and further including controlled storage means for storing data for at least one clock cycle, controlled bypass means for bypassing a storage means and controlled multiplexing means for directing data in at least two paths, so that data for a predetermined arithmetic operation may enter said integrated circuit in at least two configurations that are transformed within said first set of registers and multiplexers to a predetermined standard configuration,

a first ALU connected to output ports of both of said two multipliers for operating an output data therefrom,

a second set of registers and multiplexers connected to said first ALU, to an alternate data path from said first set of registers and multiplexers that avoids both of said two multipliers, and to two feedback data paths from a third set of registers and multiplexers, and

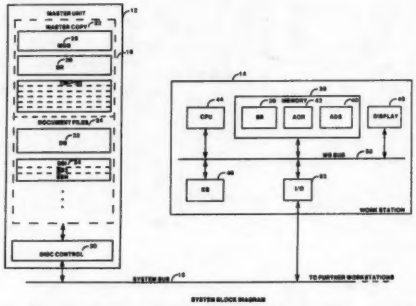
two ALUs connected in parallel between said second and third sets of registers and multiplexers, each of said two ALUs being connected on a data path from a portion of said second set of registers and multiplexers through said each of said two ALUs, a portion of said third set of registers and multiplexers and back to said second set of registers and multiplexers such that said each of said two ALUs has an accumulator mode, employing a register from one of said second and third sets of registers and multiplexers, to accumulate output data from a predetermined one of said two multipliers.

4,996,662

METHOD FOR GENERATING DOCUMENT USING TABLES STORING POINTERS AND INDEXES

James L. Cooper, and Marc D. San Soucie, both of Tyngsboro, Mass., assignors to Wang Laboratories, Inc., Lowell, Mass.

Filed Oct. 3, 1983, Ser. No. 538,644
Int. Cl.[5] G06F *15/00*
U.S. Cl. 364—900 9 Claims



1. In a document processing system including processing means and storage means a method for generating a document in the processing means and storing the document in the storage means comprising the steps of:

generating and storing a document table for storing pointers by means of which the processing means locates a plurality of indexes including pointers;

generating adaptive indexing block means locatable by the pointers in the document table for storing the indexes;

receiving information to be incorporated into the document in the processing means;

generating an information item block means for the received information;

copying the received information into the generated information item block means;

placing a pointer by means of which the processing means locates the generated information item block means in an index of the plurality of indexes according to the function of the received information in the document; and

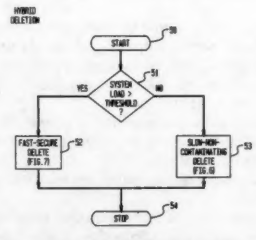
storing the information item block means and the adaptive indexing block means.

4,996,663

METHODS AND APPARATUS FOR DECONTAMINATING HASH TABLES

Richard M. Nemes, Brooklyn, N.Y., assignor to Bell Communications Research, Inc., Livingston, N.J.

Filed Feb. 2, 1988, Ser. No. 151,638
Int. Cl.[5] G06F *12/00*
U.S. Cl. 364—900 6 Claims



1. An information storage and retrieval system using hashing techniques to provide rapid access to the records in the storage

space of said system and utilizing a linear probing technique to store records with the same hash address, said system comprising

load determining means for determining the load on said system

a first record deletion means, automatically responsive to said load determining means indicating heavy loads on said system, for marking records to be deleted from said system as deleted but leaving said deleted records in place to provide a link to other records in said system, and

a second record deletion means, automatically responsive to said load determining means indicating periods of lighter load on said system, for deleting records by moving another record with the same hash address, if any, into the portions of said storage space used for said deleted record, thereby to remove previously marked ones of said deleted records left in place during said heavy loads on said system.

4,996,664

FILE SYSTEM

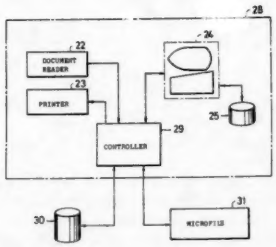
Takutoshi Fujiwara, Tokyo, and Motofumi Konishi, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 734,276, May 3, 1985, abandoned. This application Sep. 6, 1988, Ser. No. 240,466

Claims priority, application Japan, Sep. 22, 1983, 58-174120

Int. Cl.[5] G06F *15/40*

U.S. Cl. 364—900 **17 Claims**



1. A file system comprising:

first storage means for storing a plurality of retrievable image information in advance;

second storage means for storing a plurality of retrievable image information, said second storage means being of a different storing type from said first storage means;

input means for inputting retrieval information associated with desired image information; and

retrieval means for retrieving image information from said first or second storage means on the basis of common retrieval information from said input means,

wherein said retrieval means automatically selects one of said first and second storage means on the basis of the common retrieval information in order to output desired image information.

4,996,665

METHOD AND DEVICE FOR EDITING A DOCUMENT HAVING A PLURALITY OF HEADINGS

Takaaki Nomura, Yokohama, Japan, assignor to Hitachi Ltd., Tokyo, Japan

Filed Aug. 3, 1988, Ser. No. 227,653

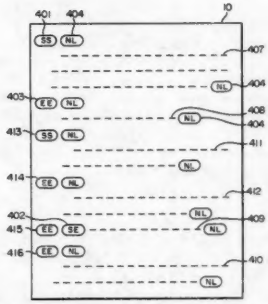
Claims priority, application Japan, Aug. 5, 1987, 62-194470

Int. Cl.[5] G06F *7/28, 7/10*

U.S. Cl. 364—900 **4 Claims**

1. A document editing device for editing a document having a plurality of headings, said document being divided into a plurality of elemental documents of a hierarchical structure, each elemental document including a parent elemental document in a first hierarchical level and child elemental documents included in said parent elemental document, said child elemental documents being in a second hierarchical level which is lower than said first hierarchical level, each of the elemental documents having a heading with a heading number, the device comprising:

a first memory for storing text data with control characters including first control characters, second control characters, and new line characters, said first control characters indicating transition of the first hierarchical level of said parent elemental document changes to said second hierarchical level of said child elemental document by a position of the first control character, and said second control characters indicating that a parent elemental document immediately ahead of said second control character ends at the position of the second control character, the new line characters each indicating that a new line in said parent or child elemental document is to be started from said new line character, said control characters being located at positions in the text data corresponding to the headings;



a second memory for storing management information including (i) a sequence of characters of each heading and (ii) data indicative of the heading number corresponding to each of the hierarchical levels of said elemental documents; and,

a processor including:

a first means comprising a means for reading the text data with control characters from said first memory and a means for detecting each control character included within the read text data with control characters, and

a second means which is initiated in response to the detection of each control character by the means for detecting for determining the heading number of the heading corresponding to each control character and for replacing each control character with the corresponding heading including the corresponding heading number and the character sequence by referring to the management information stored in the second memory,

such that the processor outputs the text data with the corresponding heading to an output device.

4,996,666

CONTENT-ADDRESSABLE MEMORY SYSTEM CAPABLE OF FULLY PARALLEL MAGNITUDE COMPARISONS

Jerome F. Duluk, Jr., 304 Emerson St., Palo Alto, Calif. 94306

Filed Aug. 12, 1988, Ser. No. 231,717

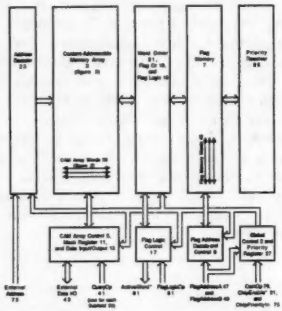
Int. Cl.[5] G11C *13/00, 15/00*

U.S. Cl. 365—49 **25 Claims**

1. A content-addresable memory including means for storing a plurality of words, each of said words comprising a plurality of data subfields, each of said data subfields being divided into a plurality of data bits,

means for providing an input field comprising a plurality of input subfields matching some of said data subfields, and each said input subfield divided into input bits so as to have a one-to-one bit correspondence to the said data bits in said data subfields in said words,

query means for simultaneously comparing said plurality of input subfields to all said words, with simultaneous sub-



field comparisons such that each said data subfield is compared to its corresponding said input subfield, and generation of a one bit query result for each said word which is true when all said data subfields within said word which are compared to one of said input subfields compare favorably to each corresponding said input subfield,

flag memory means for storing a flag bit equal to said query result for each of said words.

4,996,667

ELECTRON BEAM ADDRESSIBLE RECORDING DEVICE UTILIZING FERROELECTRIC RECORDING MATERIAL

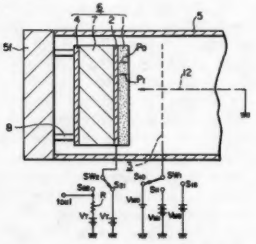
Kanji Murano, Tokyo, and Senri Miyaoka, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 187,295, Apr. 28, 1988, abandoned. This application Feb. 5, 1990, Ser. No. 480,362

Claims priority, application Japan, Apr. 29, 1987, 62-105766

Int. Cl.[5] G11C *11/22, 7/00*

U.S. Cl. 365—117 **3 Claims**



1. An electron beam addressable writing and reading device for storing binary information utilizing ferroelectric material comprising: a recording layer with one surface and another surface and formed of ferroelectric material which has secondary electron emissivity δ greater than 1, an electrode disposed on said one surface of said recording layer to which is selectively applied first or second electrical potentials which are used respectively for writing and reading said binary information, an electron gun generating an electron beam which is scanned on said another surface of said recording layer which is opposite to said one surface, means for selectively controlling the electrical potential of said another surface of said recording layer to third, fourth or fifth electrical potentials wherein said third and fourth electrical potentials are respectively higher and lower than said fifth electrical potential so that a binary one is written in said ferroelectric material when said third electrical potential is applied and a binary zero is written in said ferroelectric material when said fourth electrical potential is applied and it is scanned with said electron beam, and said third and fourth electrical potentials are selectively applied to selectively write said binary information when said first electrical potential is applied and said binary information is read when said fifth electrical potential and said second electrial potential are selectively applied.

4,996,668

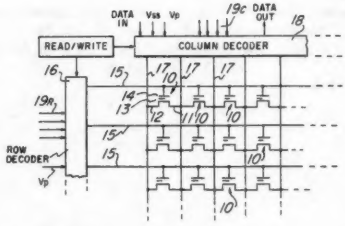
ERASABLE PROGRAMMABLE MEMORY

James L. Paterson, Richardson, and Michael C. Smayling, Missouri City, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 230,280, Aug. 9, 1988, Pat. No. 4,912,676. This application Feb. 20, 1990, Ser. No. 482,432

Int. Cl.[5] G11C *13/00*

U.S. Cl. 365—185 **8 Claims**



1. A nonvolatile memory cell, comprising:

a first field insulating region on a first portion of the surface of said substrate;

a first doped region in said substrate beneath said first field insulating regions, said first doped region providing a bit line connectable to other cells in a column;

a second field insulating region in a second portion of said substrate, said second field insulating region being separated from said first insulating region by a channel region;

a second doped region under said second field insulating region;

a gate insulator on said channel region;

a floating gate extending over said first field insulating region and onto said gate insulator;

an interlevel insulating layer on said floating gate; and

a control gate on said interlevel insulator, said control gate being connectable to other cells in a row.

4,996,669

ELECTRICALLY ERASABLE PROGRAMMABLE READ-ONLY MEMORY WITH NAND MEMORY CELL STRUCTURE

Tetsuo Endoh, Yokohama; Riichiro Shirota, Kawasaki; Masaki Momodomi, Yokohama; Tomoharu Tanaka, Yokohama; Fujio Masuoka, Yokohama, and Shigeyoshi Watanabe, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 7, 1990, Ser. No. 489,967

Claims priority, application Japan, Mar. 8, 1989, 1-55472; Aug. 31, 1989, 1-225425

Int. Cl.[5] G11C *13/00*

U.S. Cl. 365—185 **20 Claims**

1. A non-volatile semiconductor device comprising:

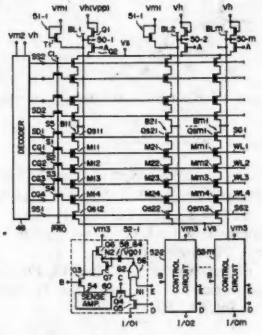
a semiconductive substrate;

parallel bit lines formed above said substrate;

parallel word lines which are provided above said substrate and intersect with said bit lines to form crossing points;

memory cells provided at the crossing points, said memory cells comprising NAND cell blocks each of which has a series-circuit of a preselected number of memory cell transistors having drain layers, carrier storage layers and control gates respectively, said word lines being connected to said control gates;

voltage controller means connected to said bit lines and word lines, for writing data into a selected memory cell transistor of a certain NAND cell block by applying specific voltages of selected potential levels to said bit



lines and said word lines in such a manner that charge carriers are moved by tunneling from the drain layer to the charge storage layer of said selected memory cell transistor; and

said voltage controller means providing a backbiasing condition for a parasitic transistor which is defined between said selected memory cell transistor and a neighboring memory cell transistor contained in a NAND cell block positioned adjacent to said certain NAND cell block, whereby leak current is decreased which tends to flow in the parasitic transistor and lower than the "H" level voltage.

4,996,670

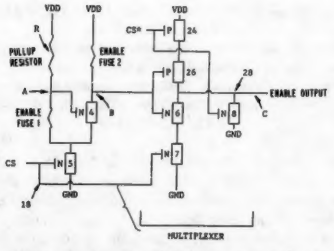
ZERO STANDBY POWER, RADIATION HARDENED, MEMORY REDUNDANCY CIRCUIT

Michael K. Ciraula; Christopher M. Durham, both of Manassas, and Derwin L. Jallice, Reston, all of Va., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 28, 1989, Ser. No. 414,889

Int. Cl.[5] G11C *7/00, 11/40, 11/407*

U.S. Cl. 365—200 **3 Claims**



1. A radiation hardened redundancy circuit for a memory having low power dissipation characteristics, comprising:

a first N channel FET device having its drain connected to a first node and its source connected to ground potential and its gate connected to a chip select signal;

a first enabling fuse connected between said first node and a second node;

a pullup impedance device connected between said second node and a positive potential;

a second N channel FET device having its drain connected to a third node, its source connected to said first node and its gate connected to said second node;

a second enabling fuse connected between said third node and said positive potential;

a multiplexer circuit having a data input connected to said third node, a control input connected to said chip select signal and having an output node coupled to a redundant storage element in a memory array, for selectively substituting said redundant storage element for a failing storage element in said memory array;

whereby a redundancy circuit is provided having no floating potential nodes and a reduced power dissipation characteristic.

4,996,671

SEMICONDUCTOR MEMORY DEVICE

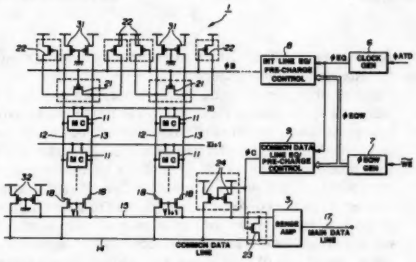
Hiroyuki Suzuki, and Shigeo Araki, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Feb. 16, 1990, Ser. No. 481,057

Claims priority, application Japan, Feb. 18, 1989, 64-39039; Feb. 21, 1989, 64-39410

Int. Cl.[5] G11C *13/00*

U.S. Cl. 365—203 **16 Claims**



5. A memory device comprising

a semiconductor substrate having a major surface,

a plurality of memory cells arranged on said major surface in a matrix configuration and composed of flipflop circuits for data storage,

a plurality of pairs of bit lines formed on said major surface and coupled to each column of said memory cells for handling complementary read-out data or write data,

a plurality of word lines formed on the major surface and provided for each row of each said memory cell for selecting the rows of said memory cells,

a plurality of pairs of common data lines formed on said major surface and connected in common to a specified number of pairs of bit lines for handling complementary readout data or writing data,

a sense amplifier connected to each pair of common data lines on said major surface and adapted for amplifying the voltage across each pair of the common data lines,

precharging means formed on said major surface and operating transiently prior to selection of said memory cell by said word line for precharging an associated pair of said common data,

precharging control means formed on said major surface for setting the operating time interval of said precharging means,

signal generating means formed on said major surface and responsive to address signals supplied for selection of said bit lines to generate a signal actuating said precharging control means, and

second signal generating means formed on said major surface and adapted for detecting the transition from the writing to readout to actuate said precharging control means at the time said transition is detected.

4,996,672

SELECTING CIRCUIT FOR A MEMORY OPERATING MODE

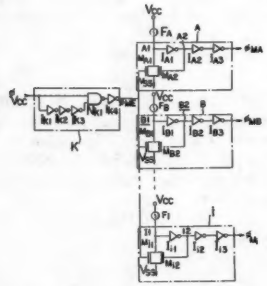
Moon G. Kim, Sihung-dong, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

Filed Dec. 28, 1988, Ser. No. 290,990

Claims priority, application Rep. of Korea, Apr. 23, 1988, 88-4649

Int. Cl.[5] G11C *7/00*

U.S. Cl. 365—225.7 **2 Claims**



1. A selecting circuit for a memory operating mode comprising: a mode enable pulse generator;

a plurality of mode selecting clock generators arranged to receive a mode enable pulse from said mode enable pulse generator; and a plurality of fuses connected, one by one, to each of the mode selecting clock generators, each of said mode selecting clock generators comprising three inverters and two nodes in which a first of said nodes is connected to the corresponding fuse and to a first inverter of said three inverters and to a pair of transistors, the second of said nodes being connected to the second transistor of said pair of transistors, and the first of said transistors of said transistor pair being connected to receive a mode enable pulse.

4,996,673

UNDERWATER CONTROL SYSTEM

John Brooke, Halifax, Canada, assignor to Her Majesty the Queen in right of Canada, as represented by the Minister of Energy, Mines & Resources, Ottawa, Canada

Filed Jun. 18, 1990, Ser. No. 539,892

Claims priority, application Canada, Jul. 18, 1989, 605989

Int. Cl.[5] G01S *15/00*

U.S. Cl. 367—131 **11 Claims**

1. An underwater control system for controlling the movement in a body of water of a submersible vehicle relative to a central unit, comprising;

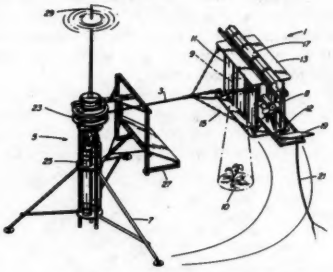
the said central unit which includes anchoring means thereon for fixedly placing the said central unit on the floor of the said body of water,

a metering drum having a predetermined circumference provided on the said central unit,

a tether to be wound and unwound about the said drum and having one end attached thereto,

the said submersible vehicle connected to the other end of the said tether for travelling in the said body of water in a substantially spiral path about the said central unit as the said tether winds or unwinds,

the said vehicle comprising propelling means for propelling the said submersible vehicle in the said body of water and a plurality of vertical wings to generate an outward force onto the said vehicle to maintain the said tether taut so



that the said vehicle travels in the said substantially spiral path.

4,996,674

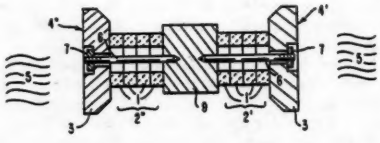
DOUBLE PISTON ACOUSTIC TRANSDUCER WITH SELECTABLE DIRECTIVITY

Stephen C. Thompson, Euclid, Ohio, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 745,184, Jun. 14, 1985, abandoned. This application Dec. 21, 1987, Ser. No. 135,477

Int. Cl.[5] H04R *17/00, 17/10*

U.S. Cl. 367—158 **11 Claims**



1. A double mass loaded transducer, comprising:

first and second head masses in contact with an acoustic medium;

first and second independently drivable active transducer elements respectively abutting said first and second head masses; and

center mass means, abutting said first and second transducer elements, for transferring vibration between said first and second transducer elements, and allowing vibration by one of said first or second head masses to be enhanced or nullified by the vibration of the other of said first or second head masses.

4,996,675

SIGNAL SENSOR INSENSITIVE TO STATIC PRESSURE VARIATIONS

Claude Beauducel, Henonville, France, assignor to Institut Francais du Petrole, Rueil-Malmaison Cedex, France

Filed Dec. 22, 1989, Ser. No. 454,973

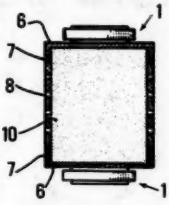
Claims priority, application France, Dec. 23, 1988, 88 17205

Int. Cl.[5] H04R *17/00*

U.S. Cl. 367—162 **13 Claims**

1. Signal sensor, wherein said insensitive to variations of static pressure prevailing in a medium in which the signal sensor is placed, the signal sensor comprising a rigid case open to said medium, at least one plate having a central flexible portion, a sensitive element in the form of a disk fixed against a first face of said plate, and filtering means for shielding the opposite face of each plate from the dynamic variations of the pressure of the medium, wherein said filtering means comprise

a volume of substantially incompressible absorbent material contained in the rigid case and adapted for transmitting the



variations of the static pressure of the medium to said opposite face.

4,996,676

MINIATURE ELECTRIC CLOCK

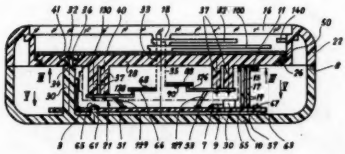
Pierre-André Noirjean, Courfaivre, Switzerland, assignor to ETA S.A. Fabriques d'Ebauches, Grenchen, Switzerland

Filed May 25, 1989, Ser. No. 356,362

Claims priority, application Switzerland, May 26, 1988, 01997/88

Int. Cl.[5] G04B *23/02*; G04C *21/16*

U.S. Cl. 368—73 **6 Claims**



1. A miniature electric clock including a base plate surmounted by a dial, time displaying hands, a back cover-caseband, a crystal and fastening means for uniting the base plate with the back cover-caseband, the base plate bearing a motor provided with a winding and a going train driven by said motor, said going train driving in turn the time displaying hands, the back cover-caseband having a printed circuit mounted thereon including electrical and electronical elements necessary for controlling the motor and first contact tracks, said winding including terminals partially formed by first spring blades, said first spring blades being brought into contact with said first tracks when the back cover-caseband is united with the base plate.

4,996,677

MULTICHANNEL MAGNETIC AND OPTICAL LINEAR HEAD

Seishi Naito, and Masaaki Hayashi, both of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Hyogo, Japan

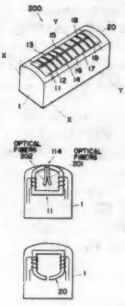
Filed Mar. 14, 1988, Ser. No. 167,841

Claims priority, application Japan, Mar. 13, 1987, 62-36820[U]

Int. Cl.[5] G11B *5/29, 5/127*

U.S. Cl. 369—14 **13 Claims**

1. A multichannel type magnetic head comprising plural magnetic cores arranged in a row which are wound with primary coils and secondary coils respectively, at least one cancellation core which is wound with a primary coil for cancellation and with a secondary coil for cancellation, and a member which integrally connects said plural magnetic cores and said at least one cancellation core, wherein detection portions of said plural magnetic cores are arranged opposed in a row with respect to an object of detection and wherein said at least one cancellation core is disposed differently from said



plural magnetic cores so as to be unresponsive to said object of detection.

4,996,678

APPARATUS FOR REWRITING AN OPTICAL DISC WHILE UPDATING ITS TABLE OF CONTENTS AND WITHOUT LEAVING GAPS

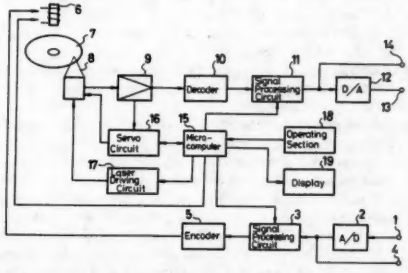
Yasuaki Maeda, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed May 2, 1988, Ser. No. 189,113

Claims priority, application Japan, May 25, 1987, 62-127369

Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—32 **8 Claims**



1. An apparatus for recording and/or reproducing an optical disc, said apparatus comprising:

an optical disc on which information signals are optically recorded and reproduced, said optical signals are rewritable so that information signals can be recorded and re-recorded thereon;

an optical pickup mounted in such a manner as to be freely movable in the radial direction of the optical disc;

operating means whereby a user can command recording and reproducing of information signals; and

control means connected to said operating means for controlling said optical pickup so that said optical pickup records information signals on the optical disc and reproduces information signals recorded on the optical disc in response to commands received from said operating means;

the optical disc having a signal recording region including a first recording region in which first information signals are recorded and a second recording region in which second information signals based on said first information signals are recorded, wherein said control means controls the operation of said optical pickup so that, when a first information signal is re-recorded in said first recording

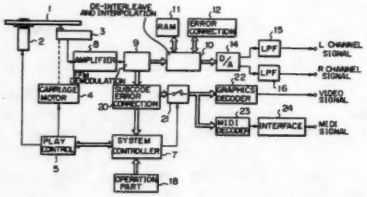
region by said optical pickup from a beginning point to a final recording terminating point that depends on the length of said first information signal as re-recorded, information written in said second recording region corresponding to the final recording terminating point is rewritten, whereby said final recording terminating point serves as a reference position for beginning further recording or re-recording in said first recording region.

4,996,679

SUBCODE INFORMATION AND BLOCK IDENTIFICATION SYSTEM FOR A DISC PLAYER

Junichi Yoshio, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jul. 14, 1989, Ser. No. 379,647
Claims priority, application Japan, Jan. 30, 1989, 1-21000
Int. Cl.[5] G11B *27/10*
U.S. Cl. 369—33 3 Claims



1. A disc playing apparatus for playing a disc on which a digital information signal divided into blocks is recorded as a subcode together with a block identification signal for identifying the blocks, in addition to a code information signal, comprising:

a reading means for reading said coded information signal and said subcode from said disc;

a decoding means for decoding the subcode and producing an information signal;

a repeating means for repeating the subcode read out by said reading means to said decoding means in response to a repeat command; and

a control means for controlling said reading means and said repeating means, wherein said control means generates, in response to a command, a jump command for moving an information reading point of said reading means across M (M is a natural number) tracks in a direction retracing a reading direction every time a predetermined time period corresponding to the relative position of the information reading point in a radial direction of the disc elapses; detects, during a period between issuing of the jump command and issuing of the next jump command, an N-block period, in which N (N is a natural number) blocks of the subcode are read out, by means of a block identification signal obtained from an output signal of the reading means; and supplies a repeating command to the repeating means only during the N-block period.

4,996,680

AUTOMATIC CHANGING APPARATUS FOR A RECORDING MEDIUM

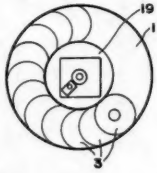
Marcel J. H. Staar, Brussels, Belgium, assignor to Starr Development Company, S.A., Belgium

Filed May 23, 1989, Ser. No. 355,656
Claims priority, application Belgium, Jun. 3, 1988, 08800627
Int. Cl.[5] G11B *17/24*
U.S. Cl. 369—37 20 Claims

1. A changing apparatus for a recording medium comprising:

an annular storage magazine having top and bottom sides and having a plurality of storage slots for storing recording media formed therein, the storage slots being sloped with respect to the top and bottom sides of the magazine and overlapping one another in the circumferential direction of the magazine;

an information transfer device for reading information from or writing information onto a recording medium; and



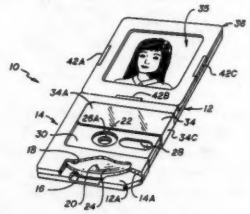
a loading device for transferring a recording medium between one of said storage slots in said magazine and a location where said information transfer device can read from or write onto the recording medium.

4,996,681

INTEGRAL CARD FOR PROTECTIVELY ENCLOSING AN OPTICAL DISK AND A VISUAL INFORMATION BEARING AREA

Vincent L. Cocco, Wakefield, and Donald L. Grimes, Milford, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Apr. 24, 1989, Ser. No. 341,909
Int. Cl.[5] G11B *3/70, 33/02*
U.S. Cl. 369—273 4 Claims



1. An integral data storage disk card comprising:

a substantially planar thin rectangular base member;

a substantially planar thin rectangular or square cover member coextensively overlying one end portion of a major surface of said base member in fixed connection thereto, said overlying portions of said base member and said cover member cooperatively defining a substantially flat thin cavity therebetween;

an optical data storage disk disposed within said cavity for rotation therein, said disk having a central hub aperture and a surrounding data storage portion, said cover or base member including a hub access aperture therethrough overlying said data disk hub aperture and an elongated data access aperture overlying a radially extending part of said data storage portion;

a shutter member disposed for sliding movement with respect to said cover and base members between a first nonoperative position in which said cover overlies said hub access aperture and said data access aperture and a second operative position in which said cover unblocks said hub access aperture and said data access aperture; and

a visually discernible information bearing layer in machine or human readable form disposed in overlying fixed relation to the other end portion of said major surface of said base member wherein said other end portion of said major surface of said base member includes an integral frame coextensive with the periphery thereof for framing said

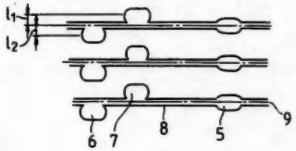
information bearing layer, said frame being pivotally connected with respect to one edge of said other end portion of said major surface of said base member for movement between an open position in which said frame is spaced apart from said other end portion of said major surface of said base member to accommodate the unobstructed placement of said information bearing layer in overlying relation to said other end portion of said major surface of said base member and a closed position in which said frame overlies the periphery of said information bearing layer so as to hold said information bearing layer in fixed overlying position with respect to said other end portion of said major surface of said base member.

4,996,682

OPTICAL INFORMATION MEDIUM HAVING PAIRED WOBBLE PITTS WITH CONTINUOUS GROOVE THEREBETWEEN

Hitoshi Yanagihara, Kamakura, and Nobuhiro Tokushuku, Yokohama, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 20, 1988, Ser. No. 260,387
Claims priority, application Japan, Nov. 7, 1987, 62-280300
Int. Cl.[5] G11B *7/24, 7/007*
U.S. Cl. 369—275.4 **14 Claims**



1. In an optical information medium having a clock pit disposed on the center line of an imaginary track and at least a pair of wobble pits disposed on both sides of said imaginary track center line, wherein an optical head traces over the imaginary track center line to record or reproduce information, the improvement characterized in that a continuous groove is formed between said paired wobble pits along said imaginary track center line in a certain area of the optical information medium so that said continuous groove contacts each of said paired wobble pits when said paired wobble pits are properly disposed with respect to said imaginary track center line in a normal condition.

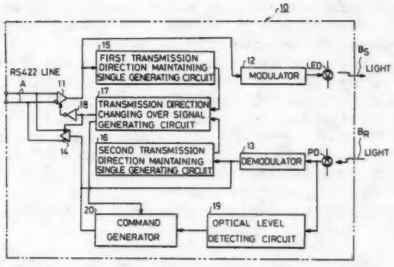
4,996,683

OPTICAL TRANSMISSION DEVICE

Tsuyoshi Yamashita, Nagoya; Goro Kobayashi, Okazaki; Hisanori Nakamura; Youichi Shibata, both of Toyota, and Toshihiro Mori, Takatsuki, all of Japan

Filed Oct. 12, 1989, Ser. No. 420,373
Claims priority, application Japan, Oct. 13, 1988, 63-258139; Dec. 12, 1988, 63-313153
Int. Cl.[5] H04B *10/02*
U.S. Cl. 370—4 **11 Claims**

1. An optical transmission device, comprising:
a receiver for receiving an electrical signal propagated over a half duplex transmission line;
an optical transmitting circuit for modulating the electrical signal received by said receiver, converting the thus modulated electrical signal into an optical signal, and transmitting the optical signal into an optical full duplex transmission line;
an optical signal receiving circuit for receiving an optical signal propagated over said full duplex transmission line, converting the received optical signal into an electrical signal, and demodulating the electrical signal;
a driver for transmitting the electrical signal given from said optical signal receiving circuit into said half duplex transmission line;
a first transmission direction maintaining signal generating circuit for detecting a start bit of a data block of the electric signal received by said receiver and generating a maintaining signal to maintain the same transmission direction for a predetermined period of time during which at least the data block can be transmitted after such detection of the start bit;
a second transmission direction maintaining signal generating circuit for detecting a start bit of a data block of the



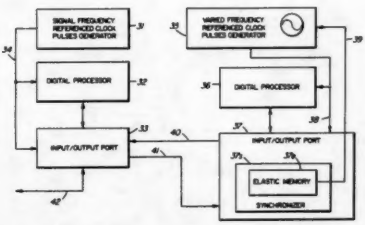
electric signal given from said optical signal receiving circuit and generating a maintaining signal to maintain the same transmission direction for a predetermined period of time during which at least the data block can be transmitted after such detection of the start bit; and
a transmission direction changing over signal generating circuit responsive to the maintaining signals given from said first or second transmission direction maintaining signal generating circuit for transmitting to said driver and said receiver a changeover controlling signal to control passage or stopping of signals by said driver and said receiver to change over the transmission direction.

4,996,684

ELECTRONIC SYSTEMS AND EFFECTIVE REDUCTION OF ELECTROMAGNETIC INTERFERENCE ENERGY PROPAGATION FROM ELECTRONIC SYSTEMS

Robert S. Morley, Ottawa; Roland A. Smith, Nepean, and Paul D. Sayre, Kanata, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Jul. 6, 1989, Ser. No. 376,105
Int. Cl.[5] H04J *3/06*
U.S. Cl. 370—100.1 **2 Claims**



1. An electronic telephone system, for selectively coupling telephone station sets and the like, in communication one with another as directed by a central processing means including a digital processor for directing call progresses between ports of a time division multiplex switching network wherein one of said ports is a digital port for receiving communications signals from a digital signals communication path, the electronic telephone system comprising:

clock signal source means for generating clock signal pulses at a predetermined frequency of occurrence being less than a maximum frequency of occurrence;

dither means, connected to the clock signal source means for causing the frequency of occurrence to be varied about the predetermined frequency of occurrence such that an average of the frequency of occurrence corresponds to the predetermined frequency of occurrence;

sequence signal generating means for generating channel and frame timing signals for regulating switching and transmission operations of the time division multiplex switching network, in response to the clock signal pulses, whereby a radiated electromagnetic energy byproduct, associated with the normal operation of the electronic telephone system, is dispersed over a wider frequency spectrum than would otherwise be so; and

a synchronizing means being connected between the time division multiplex switching network and the digital port, the synchronizing means being responsive to the clock signal pulses from the clock signal source and to timing information associated with the received communication signals, for transferring information contained therein to the time division multiplex switching network, the synchronizing means comprising:

an elastic memory of a predetermined memory capacity, the elastic memory including;

a write port for receiving the information content of the received communications signals from the digital port, in synchronism with said timing information;

a read port for transmitting the information content having been received at the write port, to the time division multiplex switching network, in synchronism with said clock signal pulses, and

means for generating an overflow signal in an event of more than a maximum fraction of the predetermined memory capacity becoming occupied by the information content from the digital port; and

wherein the dither means is operable for causing the frequency of occurrence to be momentarily increased, in response to an occurrence of the overflow signal, to reduce the fraction of memory capacity being occupied.

4,996,685

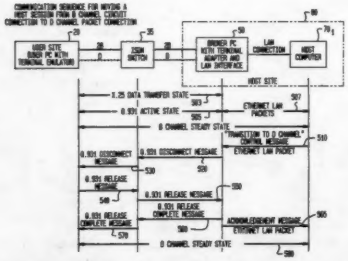
TECHNIQUE FOR DYNAMICALLY CHANGING AN ISDN CONNECTION DURING A HOST SESSION

Thomas R. Farese, Spring Lake, and Kenneth E. Ferrere, Howell, both of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.

Filed Apr. 10, 1989, Ser. No. 335,542

Int. Cl.[5] H04J *3/12*

U.S. Cl. 370—58.1 **16 Claims**



1. Apparatus for dynamically changing an access path having a plurality of different communication performance attributes between a first connection having one set of said attributes and a second connection having a different set of said attributes during an ongoing host session carried over said access path in order to provide the particular one of said first and second connections that is most suited to the current communication needs of said session, said apparatus comprising:

means for connection to one end of said access path and to a host computer for instructing a communication system that provides said access path to change a connection provided over said access path between said first and second connections in response to a command received from the host computer during execution of said host session, said instructing means comprising:

means for establishing an interface to the host computer to begin said host session and for maintaining the interface substantially throughout the remainder of the host session; and

means, responsive to said interface and for connection to said one end of the access path, for receiving a command over said interface from said host computer requesting a change in the connection provided over the access path between said first and second connections and for supplying the command over said access path in a pre-defined form as an instruction to said communication system so as to effectuate said requested change.

4,996,686

CHARGE TRANSFER DEVICE WITH RESET VOLTAGE GENERATING CIRCUIT

Shin-ichi Imai, and Tatsuya Yoshie, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

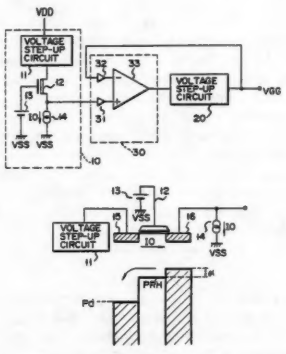
Filed May 20, 1988, Ser. No. 196,532

Claims priority, application Japan, May 21, 1987, 62-124611; Feb. 12, 1988, 63-30418

The portion of the term of this patent subsequent to Dec. 26, 2006, has been disclaimed.

Int. Cl.[5] H01L *29/78;* **G11C** *19/28*

U.S. Cl. 377—60 **2 Claims**



1. A charge transfer device comprising:

a floating diffusion region formed on a semiconductor substrate, signal charged being transferred to said floating diffusion region from a charge transfer section;

a drain region for discharging unnecessary charges when receiving a reset voltage;

a reset gate electrode for controlling the discharge of the stored charges of said floating diffusion region into said drain region, in accordance with a reset pulse;

voltage generating means for generating a voltage having a potential which is lower by "α" volts than a potential formed under said reset gate electrode when the stored charges of said floating diffusion region are discharged into said drain region, wherein "α" is a value equal to a difference between the potential of said drain region and the potential formed under said reset gate electrode when the stored charges of said floating diffusion region are discharged into said drain region;

voltage set-up means for stepping up a predetermined voltage and for supplying the stepped-up voltage as said reset voltage to said drain region; and

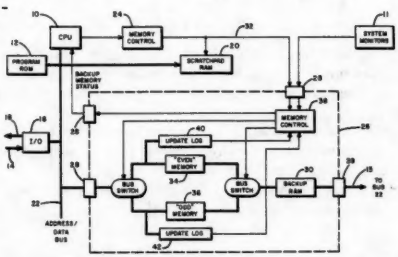
comparison/control means for generating an error voltage equal to a difference between the output voltage of said voltage generating means and said stepped-up voltage, and for controlling the voltage step-up operation by said step-up means in accordance with said error voltage.

4,996,687

FAULT RECOVERY MECHANISM, TRANSPARENT TO DIGITAL SYSTEM FUNCTION

Richard F. Hess, Glendale; Kurt A. Liebel, and Larry J. Yount, both of Phoenix, all of Ariz., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 11, 1988, Ser. No. 256,060
Int. Cl.[5] G06F *11/14, 11/16*
U.S. Cl. 371—10.1 **7 Claims**



1. In a digital computing system of the type including a central processing unit having an address/data bus coupled thereto, a main RAM, means coupled to said address/data bus for storing digital words comprising computational frames at addressable locations therein, main memory control means for effecting the writing of digital words comprising said computational frames into said main RAM at or from addresses originating at said central processing unit, apparatus for maintaining the integrity of the words comprising said computational frames stored in said main RAM in spite of system upsets due to external transient noise conditions impacting on said system, comprising:

(a) supplemental memory control means;

(b) first and second supplemental RAMs;

(c) first switching means controlled by said supplemental memory control means for alternatively coupling said first and second supplemental RAMs to said address/data bus on successive ones of said computational frames, such that the same digital words comprising a given frame being written in said main RAM are simultaneously copied into one or the other of said first and second supplemental RAMs;

(d) a backup RAM coupled to said address/data bus;

(e) second switching means controlled by said supplemental memory control means for coupling said backup RAM to said first and second supplemental RAMs such that during the time words are being copied into said first supplemental RAM, selected words stored in said second supplemental RAM during an immediately preceding computational frame are transferred into said backup RAM and during the time words are being entered into said second supplemental RAM, selected words stored in said first supplemental RAM during the immediately preceding computational frame are transferred into said backup memory means;

(f) means coupled to said supplemental memory control means for sensing system upsets due to transient noise; and

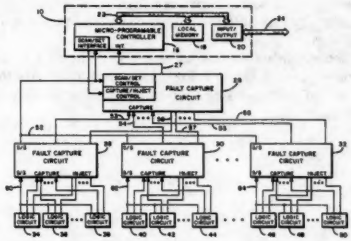
(g) means controlled by said supplemental memory control means following the sensing of a system upset for transferring the contents of said backup RAM to said main RAM.

4,996,688

FAULT CAPTURE/FAULT INJECTION SYSTEM

Larry L. Byers, Apple Valley; Kwisook Tsang, Shoreview; James H. Scheuneman, St. Paul, and Penny Svenkeson, Forest Lake, all of Minn., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Sep. 19, 1988, Ser. No. 246,512
Int. Cl.[5] G01R *31/28;* G06F *11/00*
U.S. Cl. 371—16.5 **4 Claims**



1. In a digital electronic system, apparatus for detecting and isolating faulty operation comprising, in combination:

(a) fault indication means associated with a predetermined grouping of logic circuits for producing a fault signal indicative of a fault or error condition in said grouping of logic circuits;

(b) fault capture means coupled to a plurality of fault indication means for providing a group fault output signal indicative that at least one of said fault indication means has produced said fault signal, said fault capture means including:

(i) first register means for capturing said fault signals,

(ii) error latch means set upon a first fault signal being captured in said first register means for producing said group fault output signal,

(iii) logic means responsive to said grouping fault output signal for inhibiting capture of fault signals subsequent to said first fault signal,

(iv) second register means for storing mask data, said mask data being the cumulative fault signals propagated to said first register means,

(v) means for selectively inhibiting inputs to said first register means conditional upon the state of said second register means, and

(vi) third register means connected to receive the contents of said first register means,

(c) programmable controller means including

(i) interrupt means coupled to receive said group fault signal,

(ii) capture control means for

(a) transferring the contents of said first register to said third register, and

(b) resetting said error latch means,

(iii) memory means for logging cumulative fault events occurring in said logic circuits, and

(iv) data communication means for transferring data from said third register to said memory means.

4,996,689

METHOD OF GENERATING TESTS FOR A COMBINATIONAL LOGIC CIRCUIT

Muhammad A. Samad, Sunnyvale, Calif., assignor to VLSI Technology, Inc., San Jose, Calif.

Filed Feb. 1, 1989, Ser. No. 305,449
Int. Cl.[5] G06F *11/00*
U.S. Cl. 371—22.2 **9 Claims**

1. A method of generating tests for a combinational logic circuit having a plurality of logic circuits of one type and a plurality of logic circuits of another type, said combinational logic circuit having a plurality of inputs which are supplied to

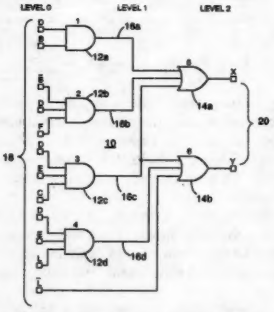
said plurality of logic circuits of one type as input thereto, said plurality of logic circuits of one type producing a plurality of first outputs which are supplied to said plurality of logic circuits of another type as inputs thereto, said plurality of logic circuits of another type producing a plurality of outputs which are the outputs of said combinational logic circuit, said method comprising the steps of:

(a) selecting one of said inputs to said combinational logic circuits and setting said one input to a logic state;

(b) determining a list of the logic circuits of one type affected by the input selected by step (a);

(c) choosing one of the logic circuits of one type from the list of step (b);

(d) setting other inputs to the logic circuit of one type chosen in step (c), to a logic state such that only the logic state of the one input of step (a) is propagated therethrough;



(e) determining a list of the logic circuits of another type affected by the first output of the logic circuit of one type from step (c);

(f) choosing one of the logic circuits of another type from the list of step (e);

(g) setting the other inputs to the logic circuit of another type chosen, to a logic state such that only the logic state of the first output of step (e) is propagated therethrough;

(h) choosing another logic circuit of another type from the list of step (e), if step (g) results in conflicting logic states, and returning to step (g);

(i) choosing another logic circuit of one type from the list of step (b), if all of the logic circuits of the another type on the list of step (e) results in conflicting logic states, and returning to step (d); and

(j) choosing another input to said combinational logic circuit and setting said another input to a logic state and returning to step (b).

4,996,690

WRITE OPERATION WITH GATING CAPABILITY

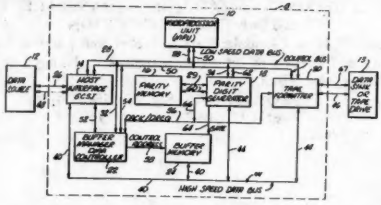
Glen A. George, Pasadena, and Douglas L. Whiting, S. Pasadena, both of Calif., assignors to STAC Electronics, Carlsbad, Calif.

Filed Aug. 26, 1988, Ser. No. 237,394
Int. Cl.[5] G06F *11/10*
U.S. Cl. 371—37.1 **18 Claims**

1. A method for generating parity digits of digital information (data) in a digital communication system, said communication system for transferring a plurality of intervals of said data from an originating data source to a data sink, each said data interval comprising one or more blocks of said data and each said block comprising one or more bytes of said data, said communication system including a data transfer bus for transferring said data intervals to and from said data source to and from a temporary storage means for holding said data intervals for a limited period, said temporary memory means located between said data source and said data sink, and said data transfer bus for transferring said data to and from said temporary storage means to and from said data sink, said method comprising the steps of:

transferring one or more of said data intervals from said data source to said temporary storage means over said data transfer bus and storing said one or more data intervals in said temporary storage means,

transferring one of said data intervals from said temporary storage means to said data sink over said data transfer bus,



during said transfer of said data interval to said data sink, calculating said parity digits associated with said data interval and storing said parity digits for further processing,

gating said data transfer bus to halt any further transfers of said data intervals between said temporary storage means and said data sink, and

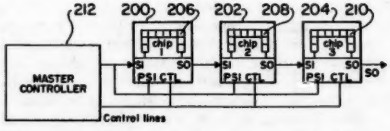
during said gating, sending said stored parity digits over said data transfer bus to said data sink.

4,996,691

INTEGRATED CIRCUIT TESTING METHOD AND APPARATUS AND INTEGRATED CIRCUIT DEVICES FOR USE THEREWITH

Philip S. Wilcox, Nepean; Benoit Nadeau-Dostie, Aylmer, and Vinod K. Agarwal, Brossard, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Sep. 21, 1988, Ser. No. 247,258
Int. Cl.[5] G06F *11/00*
U.S. Cl. 371—68.1 **11 Claims**



5. A system for testing at least two integrated circuits each having a plurality of memory devices connectable in series between an input port and an output port of the circuit, said system comprising:

(i) means interconnecting the output port of one integrated circuit to the input port of the other integrated circuit,

(ii) means for effecting interconnection of said plurality of memory devices in series between an input port and an output port;

(iii) means for initializing each series by passing a binary vector therethrough;

(iv) means for clocking each said circuit at least once in its normal operating mode;

(v) means for extracting the binary vector resulting from such clocking from each of said series;

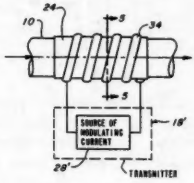
(vi) means for comparing the binary vector extracted from one of said integrated circuits with the binary vector extracted from the other of said integrated circuits and indicating any differences.

4,996,692

LASER COMMUNICATION SYSTEM WITH WIDE BAND MAGNETROSTRICTIVE MODULATION

Lawrence T. Kabacoff, Columbia, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 15, 1989, Ser. No. 408,337
Int. Cl.[5] H01S 3/10
U.S. Cl. 372—26 12 Claims



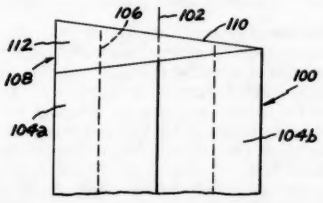
1. In combination with apparatus for modulation of laser beam radiation conducted along an optical path extending through a transmitting medium having an outer periphery, means for applying a magnetic field to the medium along a portion of said optical path and magnetostrictive means covering the outer periphery of the medium along said portion of the optical path for dimensionally changing the medium, the improvement residing in signal encoding means operatively connected to the magnetic field applying means for controllably modulating the magnetic field within a modulation bandwidth defined between limiting frequencies of a preselected band, said magnetostrictive means comprising a sheathing having a thickness that is an inverse function of said modulation bandwidth enabling bandwidth enlargement by thickness reduction of the magnetostrictive means.

4,996,693

INPUT/OUTPUT PORTS FOR A LASING MEDIUM

Allen W. Case, Jr., Amsterdam, and Carl M. Penney, Saratoga Springs, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 6, 1989, Ser. No. 376,096
Int. Cl.[5] H01S 3/06
U.S. Cl. 372—66 20 Claims



1. A port for a solid state lasing medium, the medium having a longitudinal axis, said port comprising:

an end surface integral said medium;

a first port surface integral said end surface, said first port surface being optically planar and substantially perpendicular to a first plane normal to said longitudinal axis;

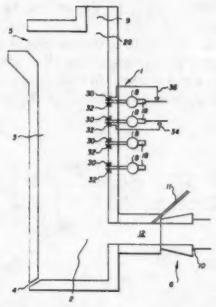
whereby each ray of a beam of electromagnetic radiation impinges on said first port surface at substantially equal angles with respect to said first port surface and whereby said port provides more symmetric pumping and cooling geometries thereby improving thermal and mechanical symmetry of the medium.

4,996,694

METHOD AND APPARATUS FOR MELTING IRON AND STEEL SCRAP

Sven Santén, Hofors, Sweden, and Jerome Feinman, Grand Junction, Colo., assignors to SKF Plasma Technologies AB, Hofors, Sweden

Continuation of Ser. No. 183,578, Apr. 19, 1988, abandoned.
This application May 12, 1989, Ser. No. 352,646
Int. Cl.[5] H05B 7/00
U.S. Cl. 373—22 10 Claims



4. Apparatus for melting iron and steel scrap, comprising a shaft furnace having a melting zone in the lower part thereof and a preheating zone in the upper part thereof, means for producing a hot reducing gas, means for introducing the hot reducing gas into the melting zone, and means for introducing oxygen containing gas into the preheating zone for combustion of the reducing gas to preheat the scrap, characterized by openings for introducing oxygen containing gas at a plurality of positions along the flow path of the reducing gas in the preheating zone, means to measure the scrap temperature and the oxygen potential of the reducing gas at said positions, and means for balancing the introduction of the oxygen containing gas to maintain the gas composition in said preheating zone in a reducing condition relative to the metal scrap at a temperature above 1000° C.

4,996,695

ARRANGEMENT FOR ACCESSING AND TESTING TELECOMMUNICATION CIRCUITS

David G. Dack, Kirkcaldy; Eric P. Huckett, Linlithgow, both of Scotland, and David W. Macintosh, Inverkeithing, United Kingdom, assignors to Hewlett-Packard, Pinewood, Calif.

Continuation of Ser. No. 418,925, Oct. 6, 1989, abandoned, which is a continuation of Ser. No. 303,002, Jan. 26, 1989, abandoned, which is a continuation of Ser. No. 177,812, Apr. 8, 1988, abandoned, which is a continuation of Ser. No. 928,225, Oct. 9, 1986, abandoned. This application Apr. 2, 1990, Ser. No. 503,129
Claims priority, application United Kingdom, Feb. 15, 1985, 8503924
Int. Cl.[5] H04M 3/24; H01J 3/14
U.S. Cl. 375—10 8 Claims

1. Apparatus for selectively accessing and testing a digital telecommunications circuit comprising:

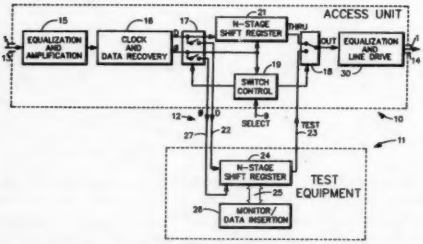
(a) an access unit (10) through which digital telecommunications data is arranged to pass via input and output ports (13,14) of the access unit; and,

(b) test equipment (11) for coupling to the access unit via a serial communication means (12), the test equipment having a test circuit path including first N-stage shift register means (24) through which the digital telecommunications data is arranged to be self-synchronously clocked when the test equipment is coupled to the access means;

said access unit (10) comprising a circuit portion including

second N-stage shift register means (21) and switch means (17,18,19) for selectively setting a route of the digital telecommunications data between the input and output ports (13,14) of the access unit, the switch means (17,18,19) being settable into (i) a first state in which the digital telecommunications data is routed directly from the input port through the second N-stage shift register means (21) and to the output port, and (ii) a second state in which, when the test equipment is coupled to the access unit, the digital telecommunications data is routed from the input port and via the connection means (12) through the test circuit path of the test equipment (11) to the output port, and also through the second N-stage shift register means (21);

the access unit (10) further comprising a clock extraction circuit (16) for generating, from the digital telecommunications data, a clock signal in synchronism with the digital telecommunications data, the clock signal being fed to the



second N-stage shift register means (21) of the access unit to clock the digital telecommunications data therethrough, and, when the test equipment is coupled to the access unit and the switch means is set in said second state, the clock signal also being fed to the first N-stage shift register means (24) to clock the digital telecommunications data therethrough;

the test equipment (11) further comprising testing means coupled to the first N-stage shift register means (24) for monitoring and altering digital telecommunications data routed therethrough when the test equipment is coupled to the access unit and the switch means is set in said second state;

the first and second N-stage shift register means (21,24) each imposing a delay of substantially equal duration on digital telecommunications data routed therethrough so that no portion of the digital telecommunications data is lost or repeated when the setting of the switch means is changed between the first and second states.

4,996,696

WAVEFORM ENCODER

David J. McCabe, Winchester, England, assignor to Shaye Communications Limited, Winchester, England

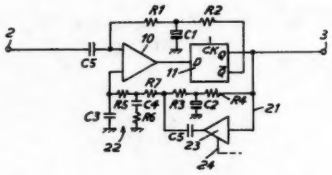
Filed Mar. 1, 1989, Ser. No. 317,665

Claims priority, application United Kingdom, Mar. 1, 1988, 8804811

Int. Cl.[5] H04B *14/06*

U.S. Cl. 375—30 **18 Claims**

1. A waveform encoder apparatus in which the encoder comprises a comparator for comparing an analogue input signal to be decoded with an estimate signal representative of an estimate of the input signal, means for digitising the output of said comparator to provide a digital output signal representative of the analogue input signal and variable gain feedback means connected to the output of said digitising means for generating from the digital output signal said estimate signal, said feedback means including digital gain control means for adjusting the gain of said feedback means in dependence upon certain predetermined characteristics of said digital output signal; wherein two of said feedback means are provided from the output of the digitising means to the input of the comparator means: a first feedback means comprising an AC coupled circuit operable to pass the frequencies of the signal being



encoded; and a second feedback means comprising a low pass filter circuit operable to pass the necessary dc bias levels, but passing signals without any significant effect thereon in the range of the frequencies of the signal being encoded.

4,996,697

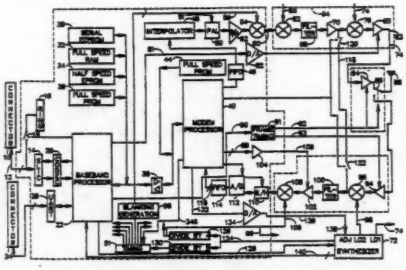
DEGLITCHING MEANS FOR DIGITAL COMMUNICATION SYSTEMS

David N. Critchlow; Graham M. Avis; Sandra J. K. Earlam, all of San Diego; Karle J. Johnson, Carlsbad; Bruce A. Smetana, Escondido; Gregory L. Westling, Poway, all of Calif.; Eric Paneth, Givataiim, Israel, and Moshe Yehushua, San Diego, Calif., assignors to International Mobile Machines Corporation, King of Prussia, Pa.

Division of Ser. No. 893,916, Aug. 7, 1986, Pat. No. 4,825,448. This application Oct. 12, 1988, Ser. No. 256,416

Int. Cl.[5] H04B *1/10*

U.S. Cl. 375—104 **1 Claim**



1. A deglitching system for removal of glitch spikes occurring during the transition periods from digital signals to analog signals comprising a timing system, a detecting means for detecting the transition periods in order to control said timing system, mixing means coupled to the output of a D/A converter to mix a blanking signal from said timing system with the analog signal received from said D/A converter during said transition periods, whereby the output of the mixer is returned to an intermediate reference level.

4,996,698

CLOCK SIGNAL RESYNCHRONIZING APPARATUS

Blaine J. Nelson, Plano, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 23, 1989, Ser. No. 425,637

Int. Cl.[5] H04L *7/033, 7/10*

U.S. Cl. 375—118 **8 Claims**

1. Apparatus for smoothing elastic buffer read/write phase hits of multiple bits comprising, in combination:

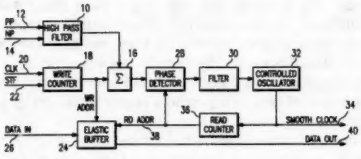
elastic buffer first means, including data, write address and read address inputs and a data output, for storing data

input written to an address provided until output in response to a provided read address;

summation second means, including first and second input means and output means, for summing the inputs to a combined output;

write counter third means, connected to said first and second means, for supplying write address outputs to said first and second means;

phase detector fourth means, connected to said output means of said second means and including feedback means and



apparatus clock output means, for providing a smoothed clock output means in response to differences between signals received via said feedback means and from said summation second means; and

read counter fifth means, connected between said apparatus clock output means of said fourth means and both the read input of said elastic buffer first means and the feedback input of said fourth means, for supplying a continuous count of the clock signal appearing at the apparatus clock output the fifth means and the fourth means providing the function of a phase locked loop.

4,996,699

DIGITALLY SETTABLE FREQUENCY DIVIDER, ESPECIALLY FOR A FREQUENCY SYNTHESIZER

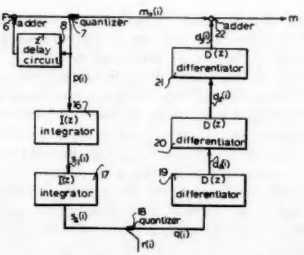
Georg Rudolph, Eningen, Fed. Rep. of Germany, assignor to Wandel & Goltermann GmbH & Co., Eningen, Fed. Rep. of Germany

Filed Jul. 11, 1989, Ser. No. 378,387

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1988, 3826006

Int. Cl.[5] G06F *7/60*

U.S. Cl. 377—49 **15 Claims**



1. In a frequency divider method for generating a frequency f_T from a given frequency f_O with a frequency divider settable only to whole-number divisor factors m and wherein on the average for a whole or fractional frequency division ratio is realized by a new setting of m to correspond to a frequency-setting information datum, a control circuit being provided which includes a phase accumulator applied with the fractional component of the frequency-setting datum and clocked by the divider output signal f_T or a signal synchronous therewith and for each frequency-division cycle a new value m is supplied, the sequence of frequency-divider factors m being calculated in real time or read from a memory when the sequence is periodic and the terms of the sequence each have two components of which a first component is constituted of the sum of the whole parts of the frequency-setting information F and is a transfer from the phase accumulator, a second of said components being calculated from the stored contents of the phase accumulator, the improvement which comprises calculating the second component, in order to reduce the spectral part of the phase perturbations falling in the vicinity of f_T in consideration of the more remote spectral parts and an increase in the absolute value of the phase perturbations to greater than $2(n-1)$ periods $1/f_O$ measured peak-to-peak, with the following steps:

integrating the contents of the phase accumulator n times, where n=2, 3, ... , in digital integrators with the input x and the output y defined by the recursion formula $y(i)=y(i-1)+x(i)$ to provide an integrated result;

cutting off said integrated result to yield an integer value; and

differentiating the integer value n+1 times in digital differentiators with the input x and the output y defined by the formula $y(i)=x(i)-x(i-1)$, the integrators, the differentiators and the phase accumulator being operated synchronously with the same computing cycle.

4,996,700

IRRADIATION EQUIPMENT FOR APPLYING SYNCHROTRON RADIATION

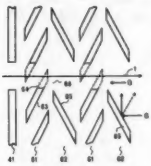
Yoshimi Yamashita, Sagamihara, and Kei Horiuchi, Zama, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 27, 1989, Ser. No. 441,616

Claims priority, application Japan, Dec. 8, 1988, 63-310422

Int. Cl.[5] G21K *1/00, 1/04;* H05H *7/00*

U.S. Cl. 378—145 **24 Claims**



1. Irradiation equipment for applying synchrotron radiation, one end of the irradiation equipment is coupled to a synchrotron, a work chamber is disposed at another end of the irradiation equipment and a synchrotron radiation beam is transmitted through the irradiation equipment, comprising:

a first multistage axial flow turbine, comprising a plurality of stators and rotors arranged alternately in an axial direction, each of said stators having vanes and a beam transmission hole, each of said rotors having vanes and gaps between adjacent vanes, said beam transmission holes are aligned in a beam direction of the synchrotron radiation beam, and said gaps of adjacent rotors are aligned in said beam direction.

4,996,701

METHOD AND DEVICE FOR SLIT RADIOGRAPHY

Ronald J. Geluk, Nootdorp, Netherlands, assignor to B. V. Optische Industrie "De Oude Delft", Delft, Netherlands

Continuation of Ser. No. 63,176, Jun. 17, 1987. This application Oct. 5, 1989, Ser. No. 417,567

Claims priority, application Netherlands, Jun. 26, 1986, 8601678

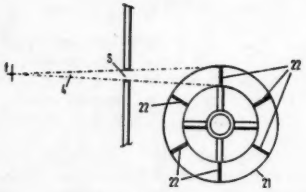
The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.

Int. Cl.[5] G21K *5/10*

U.S. Cl. 378—146 **40 Claims**

1. Method for slit radiography using an X-ray source and a slit diaphragm placed in front of the X-ray source to form a fan-shaped X-ray radiation beam for scanning a body to be

investigated to form an X-ray shadow image on an X-ray detector placed behind the body, which fan-shaped X-ray radiation beam is formed by number of sectors situated next to each other, and in which transmitted X-ray radiation is controlled instantaneously for each sector during the scanning movement by means of controllable beam sector attenuators



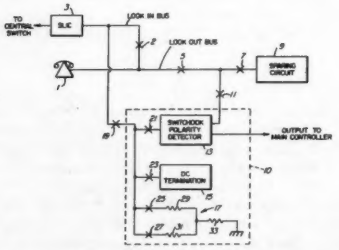
acting in conjunction with the slit diaphragm, characterized by cyclically modulating said X-ray radiation beam in a predetermined manner for all the sectors simultaneously and individually controlling said controllable beam sector attenuators to control cyclically X-ray beam radiation in each sector in synchronization with the predetermined cyclic modulation of X-ray radiation beam.

4,996,702

APPARATUS FOR TESTING SPARE LINE CIRCUITS IN A COMMUNICATION SYSTEM

Thomas Gray, Kanata, Canada, assignor to Mitel Corporation, Kanata, Canada

Filed Mar. 23, 1990, Ser. No. 498,102
Claims priority, application Canada, Jun. 28, 1989, 604279
Int. Cl.[5] H04M *1/24*
U.S. Cl. 379—1 **14 Claims**



11. A communication system comprised of line circuits, at least one sparing line circuit, means for substitution of the sparing line circuit in place of a faulty one of the line circuits, and automatic means for testing the operability of the sparing line circuit prior to said substitution.

4,996,703

REMOTE SUPERVISORY MONITORING AND CONTROL APPARATUS CONNECTED TO MONITORED EQUIPMENT

William F. Gray, Ste. 204, 203 Eldon St., Herdon, Va. 22074

Continuation-in-part of Ser. No. 853,893, Apr. 21, 1986, Pat. No. 4,748,654. This application Jan. 28, 1988, Ser. No. 149,671
The portion of the term of this patent subsequent to May 31, 2005, has been disclaimed.
Int. Cl.[5] H04M *11/00, 11/04*
U.S. Cl. 379—40 **3 Claims**

1. A monitoring and control apparatus including an apparatus connected to equipment components at a work site, said apparatus comprising:

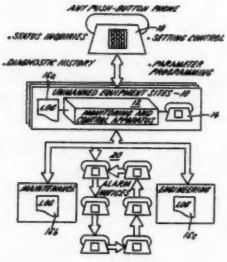
monitoring means connected to said components for sensing parameters representing equipment conditions at monitored points in said components and for producing data signals representing the sensed parameters;

programmable means including a microprocessor means having input and output ports;

said programmable means having a memory means storing programs which operate said microprocessor means to receive at said input ports and store status signals from said monitoring means, to process control commands derived from a first source when in an operator-controlled mode and from a second source when in an automatic mode, and to produce at said output ports control signals of different form to control the monitored equipment in response to control commands from one of the sources, a first form of control signal producing a first type of equipment response and a second form of control signal producing a second type of equipment response to control equipment conditions;

telephone interface means for transmitting over a public telephone network a predetermined sequence of dual-tone multi-frequency (DTMF) signals, for transmitting synthesized voice signals to an operator of an off-hook telephone, and for receiving operator-generated DTMF signals representing the first source of control commands to control equipment conditions;

voice synthesizer means operated by said microprocessor means to produce and transmit over the telephone network via said interface means oral announcements of component conditions based upon the status signals;



said programmable means also having memory means storing programs which provide the second source of control commands when in the automatic mode and:

(a) recognize the source of control commands as operator-generated DTMF signals if the apparatus is in operator-controlled mode or as signals produced by preprogrammed operation of said programmable means responsive to a particular condition in said components if the apparatus is in automatic mode; and

(b) define the response to the control commands represented by the form of the control signals supplied to at least one of the output ports of said microprocessor means;

an equipment component including a motor having a rotor connected to a parameter-adjusting element;

switch means connected to said at least one of said output ports for receiving the control signals and to said motor for energizing said motor;

wherein a program stored in said memory means defines a response to a control command in the form of control signals which actuate said switch to energize said motor to shift said parameter-adjusting element to a desired state and thereby incrementally adjust the parameter; and

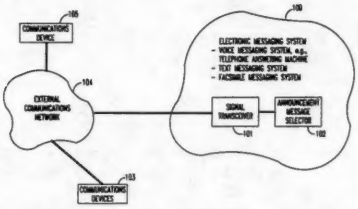
wherein said microprocessor means is operative to produce the control signals at said at least one of said output ports in accordance with a control command from one of said sources.

4,996,704

ELECTRONIC MESSAGING SYSTEMS WITH ADDITIONAL MESSAGE STORAGE CAPABILITY

Gordon R. Brunson, Broomfield, Colo., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 29, 1989, Ser. No. 414,884
Int. Cl.[5] H04M *3/50, 11/00*
U.S. Cl. 379—67 20 Claims



17. A method for use in an electronic messaging system which interfaces with a communications network, said system providing announcement messages for incoming communications from calling parties to at least one system subscriber, said method comprising the steps of

receiving an incoming communication destined for a given system subscriber, said communication including an identification of communications equipment being utilized by a calling party, and

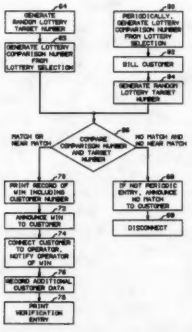
selecting a particular one of said announcement messages in response to said identification, said particular announcement message being selected from a plurality of different announcement messages associated with said given system subscriber.

4,996,705

USE OF TELECOMMUNICATIONS SYSTEMS FOR LOTTERIES

John K. Entenmann, Glendale Heights, Ill.; John A. Hooke, Rumson, N.J.; Eric E. Kampmeier, Naperville, and Barry L. Posterick, Batavia, both of Ill., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 1, 1987, Ser. No. 91,621
Int. Cl.[5] H04M *11/00;* G06F *15/28, 15/20*
U.S. Cl. 379—91 2 Claims



1. Telemarketing apparatus, comprising:

means connectable to a switched common carrier network for requesting a connection over said network to a telephone station;

announcement means, responsive to a continuance of a call-in-progress signal from said telephone station, for announcing a telemarketing message and a lottery prompt to said telephone station;

means for receiving information signals over said connection from said telephone station, said information signals representing data for a lottery entry;

processing means for determining whether said data for said lottery entry represents a winning entry, said processing means comprising means for determining a lottery target number, means for processing said information signals for said lottery entry to form a lottery comparison number, and means for matching said lottery target number and said lottery comparison number to determine whether said lottery entry is a winning entry;

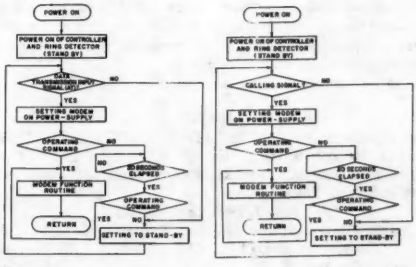
said announcement means further for notifying a customer at said telephone station of the winning entry.

4,996,706

METHOD OF CONTROLLING THE ELECTRIC POWER SUPPLIED TO A MODEM

Tae-Young Cho, Suwon, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Kyonggi, Rep. of Korea

Continuation of Ser. No. 126,766, Nov. 30, 1987, abandoned.
This application May 1, 1989, Ser. No. 345,617
Claims priority, application Rep. of Korea, Dec. 2, 1986, 86-10254
Int. Cl.[5] H04M *11/00*
U.S. Cl. 379—93 15 Claims



1. A method of controlling the supply of electrical power to a modem during those times in which data is being transmitted and received, said method including the steps of:

supplying electrical power to a controller adapted for detecting both a data transmission signal and a calling signal while said modem is at a standby mode of operation;

terminating said standby mode of operation in response to detection of any of said data transmission signal and said calling signal by said controller; and thereafter

returning said modem to said standby mode of operation by determining the absence of an operating command associated with any of said data transmission signal and said calling signal at a predetermined time interval after detection of any of said data transmission signal and said calling signal by said controller.

4,996,707

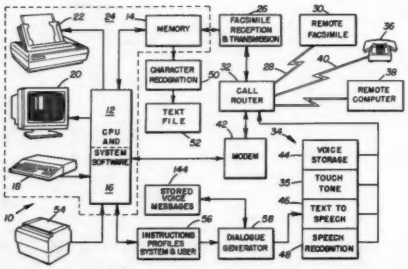
TEXT-TO-SPEECH CONVERTER OF A FACSIMILE GRAPHIC IMAGE

Sara O'Malley, New York, N.Y.; Michael H. O'Malley, and Elisabeth Peters, both of Berkeley, Calif., assignors to Berkeley Speech Technologies, Inc., Berkeley, Calif.

Filed Feb. 9, 1989, Ser. No. 308,792

Int. Cl.[5] H04M *11/00*

U.S. Cl. 379—100 **28 Claims**



1. A device for converting a graphic image of into spoken words, the graphic image represented by a single string of data composed of an ordered set of pixels, where each pixel may be represented by a binary bit, the device comprising:

computer data means for manipulating strings of data;

storage means for storing the graphic image in binary form as a single string of data, at least some of said graphic image representing written words;

recognition means for recognizing, assembling and processing at least portions of the graphic image into groups of coded characters each coded character represented by a plurality of more than one but less than nine binary bits and each coded character capable of being manipulated as a separate string of data by the computer data means; and

text-to-speech means for converting the groups of coded characters into spoken words.

4,996,708

KEY TELEPHONE SYSTEM ADAPTED TO RESPOND TO INFORMATION STORED IN A PORTABLE OUTPULSER

Katsuhiro Kakizawa, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 7, 1989, Ser. No. 389,981

Claims priority, application Japan, Aug. 9, 1988, 63-197179

Int. Cl.[5] H04M *1/26*

U.S. Cl. 379—156 **54 Claims**

6. A key telephone system comprising:

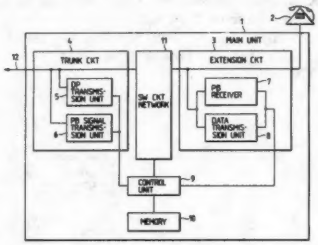
an electronic apparatus which can store a telephone number and from which the stored telephone number can be read out and used at any time;

an extension telephone;

a main unit;

receiving means for receiving information generated by said electronic apparatus;

calling means for calling in accordance with the information received by said receiving means; and



alarm means for generating an alarming when said receiving means does not receive the information within a predetermined period of time.

4,996,709

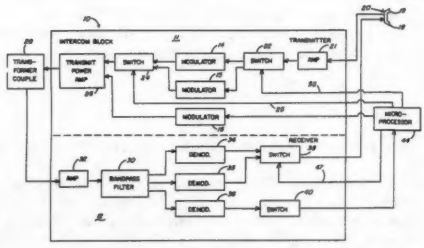
INTERCOM TELEPHONE

Jerry Heep, Weatherford, and James Henderson, Fort Worth, both of Tex., assignors to Tandy Corporation, Fort Worth, Tex.

Filed May 12, 1988, Ser. No. 193,517

Int. Cl.[5] H04J *1/14;* **H04M** *11/06*

U.S. Cl. 379—160 **27 Claims**



1. An intercom unit for supporting a multiplicity of frequency modulated intercom communication channels over a wire pair of a local telephone network, said intercom unit comprising a transmitter section and a receiver section, said transmitter section comprising;

a microprocessor,

microphone means for inputting said baseband audio signals,

a plurality of frequency modulation means, each modulation means tuned to a different carrier frequency for providing said multiplicity of communication channels,

first selection means under control of said microprocessor for selecting and coupling one of said modulation means to said microphone,

first means for coupling said frequency modulated communication channels to said wire pair of a local telephone network,

means, controlled by said microprocessor, for establishing a digital communication channel, and

means coupling said digital communication channel to said local telephone network,

and said receiver section comprising;

first means for coupling said wire pair of a local telephone network to said receiver,

frequency filter means connected to said coupling means adapted to separate signals from said wire pair into said multiplicity of frequency modulated communication channels,

a plurality of frequency demodulation means connected to

said frequency filter means for extracting the baseband audio signal from each communication channel,

speaker means, and

second selection means coupled between said speaker and said frequency demodulation means for selectively connecting one of said frequency demodulation means to said speaker means, under control of said microprocessor, and

means for receiving said digital communication channel from said wire pair and for coupling said digital communication channel to said microprocessor.

4,996,710

SIDE-TONE ADJUSTING SYSTEM AND METHOD FOR KEY TELEPHONE SYSTEM ESTABLISHING A PLUREL KINDS OF SPEAKING PATHS

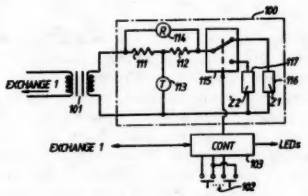
Toshiaki Takahashi, and Yasuji Sato, both of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Sep. 25, 1989, Ser. No. 411,378

Claims priority, application Japan, Sep. 28, 1988, 63-243178

Int. Cl.[5] H04M *1/00, 1/76, 3/56*

U.S. Cl. 379—202 **16 Claims**



14. In a switching system having an exchange with an exchanging switch coupled to a plurality of telephone lines, a plurality of telephone sets coupled to said exchange, wherein said exchange, responsive to a conference request from said telephone set, carries out a conference connection by a conference method, to establish communication paths between said selected telephone line and said telephone sets corresponding to the conference request, said conference method comprising the steps of:

(a) storing a plurality of impedance information for the conference connection between said telephone line and said telephone sets and one communication connection between said telephone set and said telephone line or other telephone set;

(b) generating the conference request in response to a predetermined manual key operation;

(c) determining said stored conference impedance information in response to the generated conference request and generating the determined impedance information:

(d) selecting a balanced impedance, corresponding to the generated impedance information, to obtain a suitable side-tone: and

(e) adjusting a side-tone in response to the selected balanced impedance.

4,996,711

SELECTED-EXPONENT SIGNATURE SYSTEMS

David L. Chaum, 14652 Sutton St., Sherman Oaks, Calif. 91403

Filed Jun. 21, 1989, Ser. No. 368,677

Int. Cl.[5] H04L *9/30*

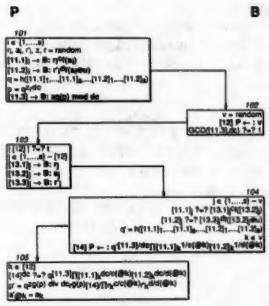
U.S. Cl. 380—30 **15 Claims**

1. A method for verifying public-key digital signatures, the method comprising the steps of:

determining an exponent from a first message by a first party using a procedure known to the first party and a second party, the exponent containing at least one prime factor uniquely determined by said message;

forming by said first party of a root based on a constant known to said first party and said second party, said root forming a part of said exponent;

communicating said root to said second party by said first party; and



checking the validity of said root by said second party computing said exponent, raising said root to said exponent to provide a result, and verifying that the result is said constant.

4,996,712

HEARING AIDS

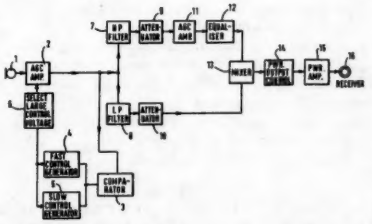
Roger F. Laurence, deceased, late of Camberley, and Leon R. Morgan, executor, London, both of England, assignors to National Research Development Corporation, London, England

Continuation of Ser. No. 72,475, Jul. 13, 1987, abandoned. This application Jan. 17, 1990, Ser. No. 465,523

Claims priority, application United Kingdom, Jul. 11, 1986, 8616959

Int. Cl.[5] H04R *25/00*

U.S. Cl. 381—68.4 **21 Claims**



1. A hearing aid comprising:

automatic gain control means for compressing the dynamic range of an input signal by providing a reduced gain when the input signal has an amplitude exceeding a predetermined threshold so as to produce an output signal of substantially constant average signal level in response to input signal levels within a predetermined range, said automatic gain control means further comprising,

first gain control means for controlling gain in response to a normal speech level component of the input signal, said first gain control means having a first release time,

second gain control means for controlling gain in response to a transient or impulsive component of the input signal having a larger amplitude than said normal speech level component, said second gain control means being set to reduce gain in response to said transient or impulsive component relative to said normal speech level component without suppressing low amplitude speech signals,

and said second gain control means having a second release time which is shorter than said first release time;

a plurality of signal processing channels for providing processed output signals, each of said signal processing channels receiving the output signal from said automatic gain control means and including frequency dependent filtering means; and

means for providing a combined output signal from the processed output signals and for supplying the combined output signal to an electro-acoustic output transducer.

4,996,713

ELECTROACOUSTIC PIEZOELECTRIC TRANSDUCER HAVING A BROAD OPERATING RANGE

Helio T. Bittencourt, Sao Paulo, Belize, assignor to S. Eletro-Acustica S.A., Belize

Filed Sep. 25, 1989, Ser. No. 411,650
Int. Cl.[5] H04R *17/00*; H01L *41/00*
U.S. Cl. 381—190 **10 Claims**

6. An electroacoustic transducer, comprising:

a concave diaphragm having a substantially central apex through which an axis extends along which vibrations occur when producing or receiving soundwaves, and an outer peripheral region about which said concave diaphragm can be mounted on a housing;

at least two planar bimorph elements having different respective resonance frequency characteristics, each of said planar bimorph elements being directly connected to said concave diaphragm; and

electric circuit means for coupling electrodes of said planar bimorph elements to a voltage source.

4,996,714

COMPUTERIZED FILING AND RETRIEVAL SYSTEM FOR SIGNATURE AND PICTORIAL DOCUMENTATION

Pierre Desjardins, Bellefeuille; Paul Trudel, Vimont, and Jean-Marc Leroux, Ste-Dorothée, all of Canada, assignors to Frisco Bay Industries of Canada Limited, St. Laurent, Canada

Filed May 23, 1990, Ser. No. 527,390
Int. Cl.[5] G06K *9/00*
U.S. Cl. 382—3 **8 Claims**

1. A computerized filing and retrieval system for signatures and pictorial documentation which comprises:

camera means;

a microcomputer having a memory means and being in communication with said camera means;

means for converting pictorial and signature information to coded data which is stored in said memory means at predetermined locations thereof;

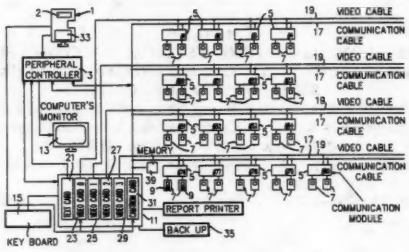
peripheral controller means in communication with said microcomputer;

a plurality of communication controller means in communication with said microcomputer;

a plurality of monitors for displaying said signature and pictorial documentation;

each said monitor being in communication with only one communication controller means, each said communication controller means being in communication with up to two monitors;

wherein, on receipt of a query signal by an nth communication controller means from an mth monitor, in communication with said nth communication controller means, said



query signal being associated with a pth signature or pictorial document, said nth communication controller means queries said microcomputer;

said microcomputer determining the location of the coded data associated with said pth signature or pictorial document in said memory means and decoding said coded data associated with said pth signature or pictorial document;

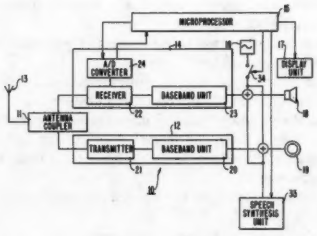
whereby, to provide, to said mth controller, the data for creating said pth signature or pictorial document through said nth communication controller means.

4,996,715

RADIO TELEPHONE APPARATUS

Kuniyoshi Marui, Saitama, and Kiyoshi Hattori, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Japan

Filed Sep. 21, 1988, Ser. No. 248,921
Claims priority, application Japan, Sep. 29, 1987, 62-244621
Int. Cl.[5] H04Q *7/04*
U.S. Cl. 455—33 **24 Claims**



1. A cellular radiotelephone unit for use in a cellular radiotelephone system for serving one or more geographic areas formed of a plurality of cellular zones, the cellular radiotelephone unit comprising:

receiving means for receiving radio signals transmitted over a speech radio channel or a control radio channel;

measuring means, coupled to the receiving means, for measuring the strength of the radio signals received by the receiving means;

alarming means for alarming at least the user of the cellular mobile radiotelephone unit in response to the detection of a signal strength value measured by the measuring means at or below a first predetermined value after a communi-

cation link with a second party using the speech radio channel is established; and

control means for controlling the receiving means to receive radio signals transmitted over the control radio channel, in stead of tne speech radio channel, in response to the detection of a signal strength value measured by the measuring means at or below a second predetermined value, the second predetermined value being no greater than the first predetermined value.

4,996,716

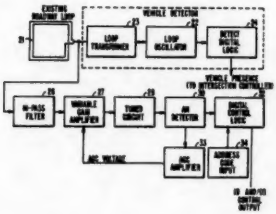
VEHICLE COMMUNICATION SYSTEM USING EXISTING ROADWAY LOOPS

Thomas Potter, Los Alamitos, and Thomas Seabury, Diablo, both of Calif., assignors to Detector Systems, Inc., Stanton, Calif.

Continuation of Ser. No. 138,122, Dec. 28, 1987, abandoned. This application Dec. 28, 1989, Ser. No. 462,287

Int. Cl.[5] H04B *5/00*

U.S. Cl. 455—41 **14 Claims**



1. A communication system for enabling transfer of information between a vehicle and a stationary information location having a vehicle detector system with a loop antenna, said loop antenna comprising part of a circuit containing conventional vehicle detector system signals normally lying within a given frequency range, said conventional vehicle detector system signals normally being present within said loop antenna, said communication system comprising:

a vehicle mounted transmitter means for enabling transmission of a preselected information signal over a relatively small distance range; and

stationary receiver means for receiving said information signal transmitted by said transmitter means when within said distance range,

said vehicle mounted transmitter means including means for generating a carrier frequency signal lying within a transmitting frequency range different from the frequency range of the vehicle detector system loop signals and containing said preselected information signal,

said receiver means including the vehicle detector system loop antenna and means for distinguishing said preselected information signal from the conventional vehicle detector signals concurrently present in said vehicle detector system loop antenna.

4,996,717

RADIO RECEIVER NOISE SQUELCHING AND OPERATIONAL INDICATING ALARM

Robert H. Koening, Rd. 1, Coats Rd., Burdett, N.Y. 14818

Filed Oct. 26, 1989, Ser. No. 427,725

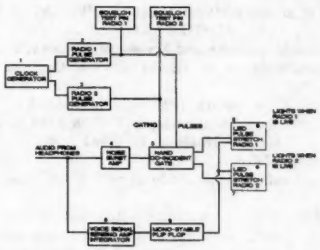
Int. Cl.[5] H04B *1/10*

U.S. Cl. 455—222 **12 Claims**

1. A radio receiver operational checking system comprising in combination:

(a) a radio receiver including an active radio noise squelch circuit, set at a level to eliminate ambient noise (atmospheric and receiver noise) when no radio signal is being received, and including a squelch control connection point where said squelch circuit can be disabled by the application of a voltage of appropriate magnitude,

(b) a clock-driven pulse source for said radio receiver providing repetitive short pulses for application to said



squelch control connection point to deactivate momentarily said noise squelch circuit at regular intervals to provide repetitive, short noise pulses in the audio output of said radio receiver indicating that said radio receiver is operational and awaiting a radio frequency signal.

4,996,718

FREQUENCY CONVERTER CIRCUIT

Yasufumi Shiomi, Suita, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

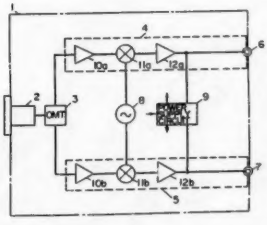
PCT No. PCT/JP88/00535, § 371 Date Jan. 30, 1989, § 102(e) Date Jan. 30, 1989, PCT Pub. No. WO88/10024, PCT Pub. Date Dec. 15, 1988

PCT Filed Jun. 1, 1988, Ser. No. 309,730

Claims priority, application Japan, Jun. 2, 1987, 62-138525

Int. Cl.[5] H04B *1/26*

U.S. Cl. 455—323 **6 Claims**



5. A frequency converter circuit comprising: an input waveguide portion for receiving a satellite broadcast signal, separating means for separating an input signal outputted from said input waveguide portion in accordance with kinds of polarizations, a first mixer circuit including a mixer diode for receiving a first signal separated and outputted by said separating means, a second mixer circuit including a mixer diode for receiving a second signal separated and outputted by said separating means, a single local oscillator connected to said first mixer circuit and said second mixer circuit for distributing and supplying a local oscillation signal thereof to said first and second mixer circuits, a biasing power supply circuit for supplying a bias current to the mixer diodes of said first and second mixer circuits, and first and second diodes whose anodes are respectively connected to an output terminal to which an intermediate frequency signal converted by said first mixer circuit is outputted and an output terminal to which an intermediate frequency signal converted by said second mixer circuit is outputted and whose cathodes are connected to each other to provide a junction point thereof, and wherein said biasing power supply circuit are connected to the junction point of said cathodes of said first and second diodes, whereby a volt-

age generated from said junction point of said cathodes is maintained as a constant voltage to supply the bias current to said mixer diodes.

4,996,719

OPTICAL COMMUNICATION APPARATUS FOR MOTOR VEHICLE

Kunio Okazaki, Hadano, and Kiyomitsu Ishikawa, Tokyo, both of Japan, assignors to Stanley Electric Co., Ltd., Tokyo, Japan

Filed Feb. 15, 1989, Ser. No. 311,532

Claims priority, application Japan, Feb. 26, 1988, 63-24903[U]

Int. Cl.[5] H04B *10/14;* H04J *14/02*

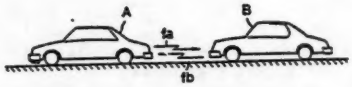
U.S. Cl. 455—606 **15 Claims**

1. An optical communication apparatus for vehicles, comprising:

at least one of a rear combination lamp and a marker lamp on a first vehicle, said at least one of a rear combination lamp and marker lamp including a light emitting means for emitting a visually observable light signal;

a source of optical communication signals, including said light emitting means of said at least one of a rear combination lamp and a marker lamp of said first vehicle for use also for generating optical communications signals;

light receiving means on said first vehicle and located in the vicinity of said light emitting means for receiving from a light source in a second vehicle optical communications signals related to an original signal;



transmitting means on said first vehicle and coupled to said light emitting means for causing said light emitting means to also emit said optical communications signals; and

receiver means coupled to said light receiving means for converting said received optical communications signals into substantially said original signal.

DESIGN PATENTS

GRANTED FEB. 26, 1991

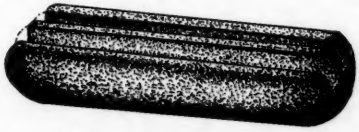
ERRATA

For CLASS	See PATENT NO.
D09-432	314,907
D14-118	314,931
D99-030	315,045

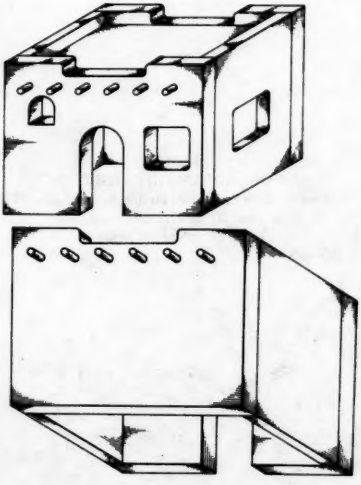
DESIGNS

FEBRUARY 26, 1991

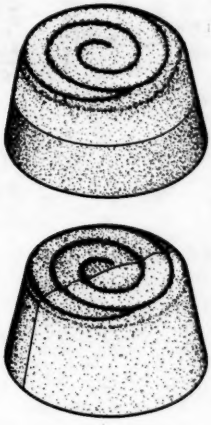
314,853
HOT DOG BUN FOR TWO HOT DOGS
Lamills A. Garrett, 1239 Harden St., Columbia, S.C. 29204
Filed Jun. 25, 1987, Ser. No. 66,401
Term of patent 14 years
U.S. Cl. D1—101



314,854
GINGERBREAD HOUSE
Paula C. Brown, 14857 Olympic View Loop Rd., Silverdale, Wash. 98383
Filed Apr. 7, 1988, Ser. No. 179,897
Term of patent 14 years
U.S. Cl. D1—106

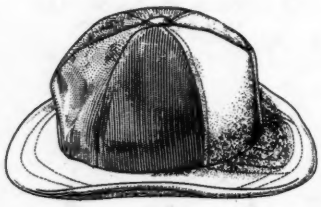


314,855
CONFECTION
Salvatore A. Puglisi, Wayne, and Carolina Calayan, Morris Plains, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.
Filed May 28, 1987, Ser. No. 56,210
Term of patent 14 years
U.S. Cl. D1—127

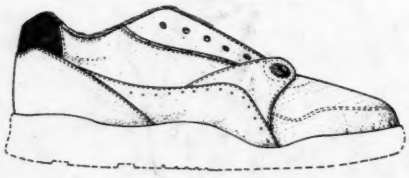


314,856
SHIRT
Hans-Georg Heffe-Sander, Gartenstrasse 19, 6057 Dietzenbach-Steinberg, Fed. Rep. of Germany, and Alfred Gruber, Deisten 19, 8125 Zollikerberg, Switzerland
Filed Oct. 28, 1987, Ser. No. 114,878
Claims priority, application Fed. Rep. of Germany, Apr. 28, 1987, 5 MR 10765
Term of patent 14 years
U.S. Cl. D2—215

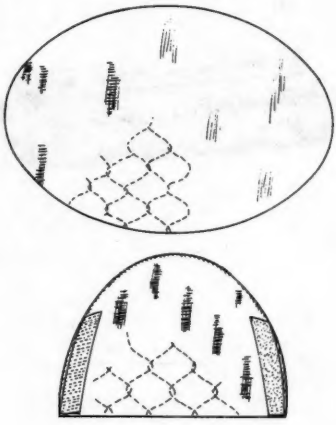
314,857
HAT
Roy L. Vossler, Box 1074, Redcliff, Alberta, Canada (T0J 2P0)
Filed Nov. 20, 1987, Ser. No. 123,652
Claims priority, application Canada, Aug. 5, 1987, 05-08-87-2
Term of patent 14 years
U.S. Cl. D2—257



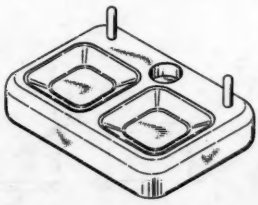
314,858
SHOE UPPER
Daniel Richard, Westlinn; K. Wayne Spinney, Oswego, and Miza Mourad, Portland, all of Oreg., assignors to Avia Group International, Inc., Portland, Oreg.
Filed Feb. 14, 1990, Ser. No. 479,722
Term of patent 14 years
U.S. Cl. D2—314



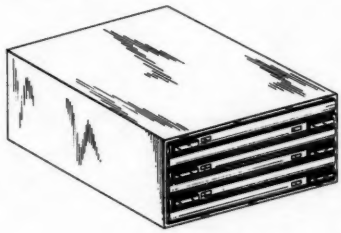
314,859
SHOULDER BELT COVER OR SIMILAR ARTICLE
Judy M. Weightman, and Andrew K. Mirikitani, both of 77 Mott-Smith Dr., #1500, Honolulu, Hi. 96822
Filed Jul. 11, 1986, Ser. No. 884,420
Term of patent 14 years
U.S. Cl. D2—639



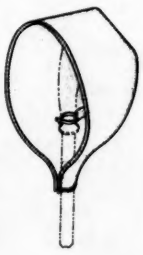
314,860
SEWING ACCESSORY HOLDER
Lloyd W. Austin, 1838 Lakeside, Bellingham, Wash. 98226
Filed Jan. 20, 1987, Ser. No. 5,139
Term of patent 14 years
U.S. Cl. D3—25



314,861
CONTAINER FOR DISKS
Peter A. Ackeret, Kusnacht, Switzerland, assignor to IDN Inventions and Development of Novelties AG, Chur, Switzerland
Division of Ser. No. 935,579, Nov. 26, 1986. This application Jun. 7, 1990, Ser. No. 534,665
Claims priority, application World Int. Prop. O., May 30, 1986, DM/006989
Term of patent 14 years
U.S. Cl. D3—35

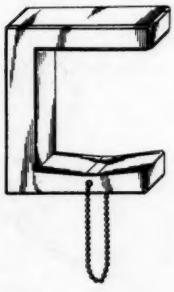


314,862
GLOVE COVER FOR ATTACHMENT TO A SKI POLE
Lovena M. Stevenson, 318 Cricket La., Woodbridge, N.J. 07095
Filed Feb. 29, 1988, Ser. No. 161,608
Term of patent 14 years
U.S. Cl. D3—36

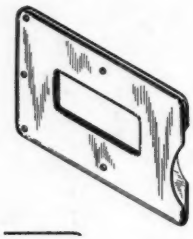


314,863
HERMETICALLY SEALABLE COVER FOR GOLF CLUBS AND BAG
Wayne W. R. Brengel, 37 Plennert Rd., Flemington, N.J. 08822
Filed Oct. 13, 1988, Ser. No. 257,349
Term of patent 14 years
U.S. Cl. D3—37

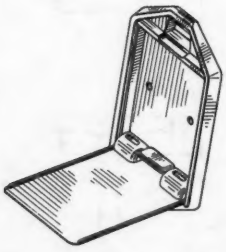
314,864
TABLE TOP HOOK FOR PURSE OR SIMILAR ARTICLE
Kenny D. Creed, Rte. 1, Box 198A, Moberly, Mo. 65270
Filed Sep. 28, 1988, Ser. No. 250,423
Term of patent 14 years
U.S. Cl. D3—54



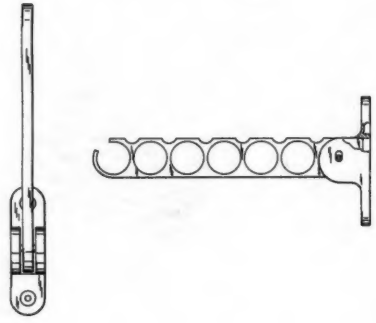
314,865
CREDIT CARD CASE
Jaakko Tuisku, Kauhajoki, Finland, assignor to Kauhajoen Mainostuote Oy, Finland
Filed Jan. 6, 1988, Ser. No. 141,465
Term of patent 14 years
U.S. Cl. D3—56



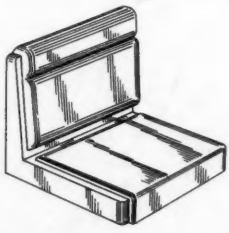
314,866
CAMERA STRAP ATTACHABLE NOTE PAD CONTAINER
Joel E. Scott, 1717 Spring Creek Dr., Sarasota, Fla. 34239
Filed Mar. 9, 1987, Ser. No. 23,467
Term of patent 14 years
U.S. Cl. D3—100



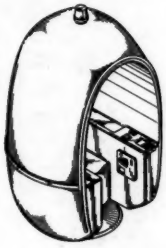
314,867
CLOTHES HANGER HOLDER
Sheldon Goodman, 4079 Princeton Blvd., South Euclid, Ohio, and Steven E. Greenhut, 2781 Belgrave Rd., Pepper Pike, Ohio
Filed Jul. 20, 1987, Ser. No. 75,311
Term of patent 14 years
U.S. Cl. D6—324



314,868
SEAT
Jeffrey F. Camacho, Naperville, Ill., assignor to Artifax Design International Corporation, Lombard, Ill.
Filed Nov. 10, 1987, Ser. No. 118,966
Term of patent 14 years
U.S. Cl. D6—334



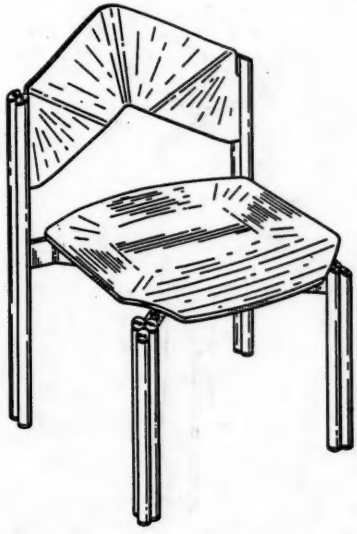
314,869
COMBINED CHAIR AND AUDIO UNIT
Lynda G. Entratter, 6001 Savoy, #606, Houston, Tex. 77036
Filed Sep. 10, 1987, Ser. No. 94,858
Term of patent 14 years
U.S. Cl. D6—335



314,870
CHAIR
Catherine Walsh, 41-29 39th Pl., Sunnyside, N.Y. 11104
Filed Jun. 30, 1987, Ser. No. 68,053
Term of patent 14 years
U.S. Cl. D6—358

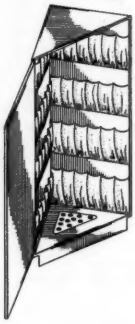
314,871
FOLDABLE CHAIR
Charles R. Goetz, Carnegie, Pa., assignor to Alco Industries Inc., Valley Forge, Pa.
Filed Jul. 13, 1987, Ser. No. 72,586
Term of patent 14 years
U.S. Cl. D6—368

314,872
CHAIR
Hartmut S. Engel, Freiberg, Fed. Rep. of Germany, assignor to August Fröscher GmbH & Co. K.G., Steinheim, Fed. Rep. of Germany, a part interest
Filed Apr. 3, 1987, Ser. No. 35,470
Claims priority, application Fed. Rep. of Germany, Oct. 3, 1986, 1535
Term of patent 14 years
U.S. Cl. D6—380

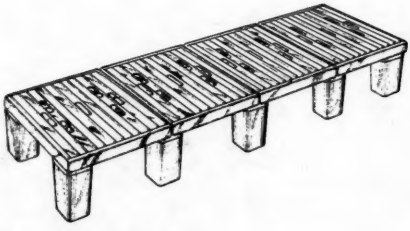


314,873
COLLAPSIBLE MUSIC STAND
Kari J. Wenger, Cincinnati, Ohio, and Eugene N. Reshanov, Golden Valley, Minn., assignors to Wenger Corporation, Owatonna, Minn.
Filed Jul. 16, 1987, Ser. No. 74,435
Term of patent 14 years
U.S. Cl. D6—419

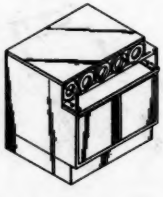
314,874
SHOE CABINET
Bonnie J. Quartermaine, Suite 5-221, P.O. Box 17135, Phoenix, Ariz. 85011
Filed Jul. 24, 1987, Ser. No. 77,323
Term of patent 14 years
U.S. Cl. D6—432



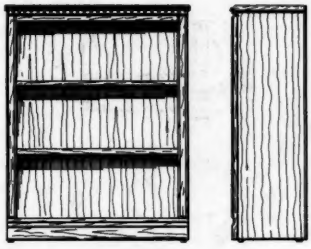
314,875
DUNNAGE RACK
David A. Juergens, Winchester, Va., assignor to Rubbermaid Commerical Products Inc., Winchester, Va.
Filed Jan. 14, 1988, Ser. No. 143,690
Term of patent 14 years
U.S. Cl. D6—449



314,876
COMBINED STORAGE AND CUP DISPENSER UNIT
J. Marshall Suttles, Elberton, Ga., assignor to Royston Corporation, Royston, Ga.
Division of Ser. No. 871,766, Jun. 9, 1986. This application Jul. 28, 1989, Ser. No. 395,452
Term of patent 14 years
U.S. Cl. D6—469

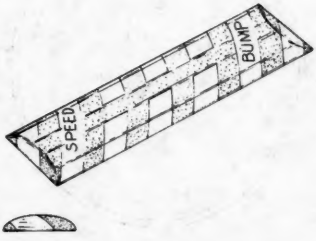


314,877
BOOKCASE
Paul Bush, Lakewood, N.Y., and Bruce O. Anderson, Talbott, Tenn., assignors to Bush Industries, Inc., Jamestown, N.Y.
Filed Apr. 29, 1988, Ser. No. 188,384
Term of patent 14 years
U.S. Cl. D6—479



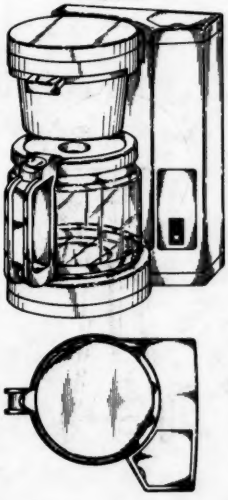
314,878
TABLE
Richard S. Hart, Elgin, Ill., assignor to Soft Sheen Products, Inc., Chicago, Ill.
Filed Jul. 8, 1987, Ser. No. 71,043
Term of patent 14 years
U.S. Cl. D6—486

314,879
PILLOW
James B. Painter, 130 S. 13th St., Easton, Pa. 18042
Filed May 27, 1988, Ser. No. 199,595
Term of patent 14 years
U.S. Cl. D6—597

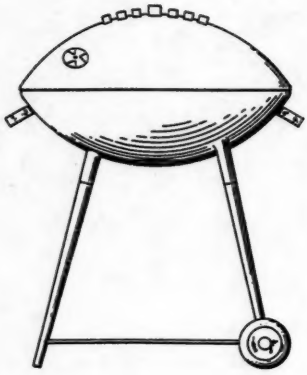


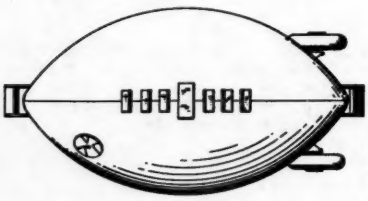
314,880
BEVERAGE STIRRER
Freddie F. Rentsch, 4141 Fox Run Trail, #11, Cincinnati, Ohio 45255
Filed Nov. 19, 1987, Ser. No. 122,664
Term of patent 14 years
U.S. Cl. D7—300.2

314,881
COFFEE MAKER
Martin J. Wondergem, West Bend, Wis., and William C. Cesaroni, Glenview, Ill., assignors to Dart Industries Inc., Deerfield, Ill.
Filed Mar. 16, 1988, Ser. No. 169,194
Term of patent 14 years
U.S. Cl. D7—309

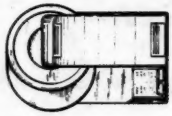


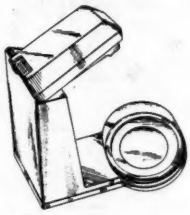
314,882
BARBEQUE GRILL
James A. Bethel, Jr., 355 Possum Ct., Capitol Heights, Md. 20743
Filed Oct. 14, 1988, Ser. No. 257,783
Term of patent 14 years
U.S. Cl. D7—334



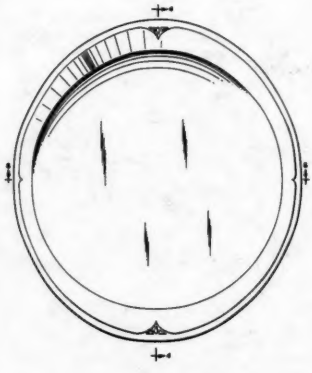


314,883
FOOD MIXER
Stuart Naft, Stratford, Conn., assignor to Black & Decker, Inc., Newark, Del.
Filed Aug. 25, 1988, Ser. No. 236,137
Term of patent 14 years
U.S. Cl. D7—379





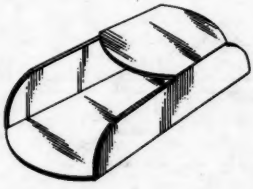
314,884
SERVING PLATE OR SIMILAR ARTICLE
Steve A. Unger, Manlius, N.Y., assignor to Syracuse China Corporation, Syracuse, N.Y.
Filed Mar. 3, 1988, Ser. No. 163,931
Term of patent 14 years
U.S. Cl. D7—545



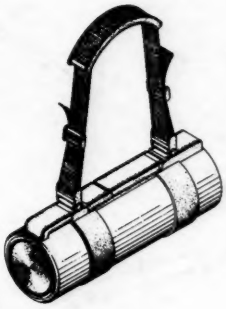
314,885
SERVING TRAY OR THE LIKE
Donald A. Brunner, 2073 Kratz Station Rd., Harleysville, Pa. 19438
Filed Mar. 7, 1988, Ser. No. 164,625
Term of patent 14 years
U.S. Cl. D7—554

314,886
FOOTED DESSERT CUP
Elliott N. Zivin, 8 Colony Rd., Westport, Conn. 06880
Filed Nov. 7, 1986, Ser. No. 929,145
Term of patent 14 years
U.S. Cl. D7—558

314,887
PITA SANDWICH HOLDER
Chris Tomaras, Evanston, Ill., assignor to Kronos - Central Products, Inc., Chicago, Ill.
Filed Nov. 14, 1988, Ser. No. 271,211
Term of patent 14 years
U.S. Cl. D7—601



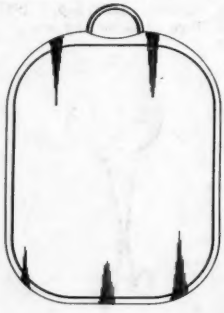
314,888
VACUUM BOTTLE
Kaori Mano, and Nobuyuki Enomoto, both of Kyoto, Japan, assignors to Japan Oxygen Co., Ltd., Japan
Filed Sep. 6, 1988, Ser. No. 245,198
Claims priority, application Japan, Mar. 10, 1988, 63-9714
Term of patent 14 years
U.S. Cl. D7—605



314,889
TONGS
Bortolo Bonomi, Bedizzole, Italy, assignor to AGHIFUG S.p.A., Bedizzole, Italy
Filed Oct. 16, 1987, Ser. No. 109,847
Claims priority, application Italy, Sep. 7, 1987, 7090/87[U]
Term of patent 14 years
U.S. Cl. D7—687

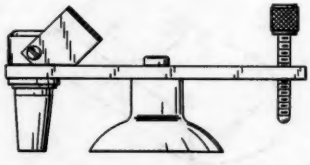
314,890
FISH SCALER
Allen P. Gilmer, 479 E. Paces Ferry Rd. NE, #822, Atlanta, Georgia 30315
Filed Mar. 30, 1989, Ser. No. 330,870
Term of patent 14 years
U.S. Cl. D7—693

314,891
CHOPPING BOARD
Shigenori Sata, Osaka, Japan, assignor to Kobayashi Manufacturing Company, Ltd., Osaka, Japan
Filed Dec. 22, 1988, Ser. No. 288,716
Term of patent 14 years
U.S. Cl. D7—698

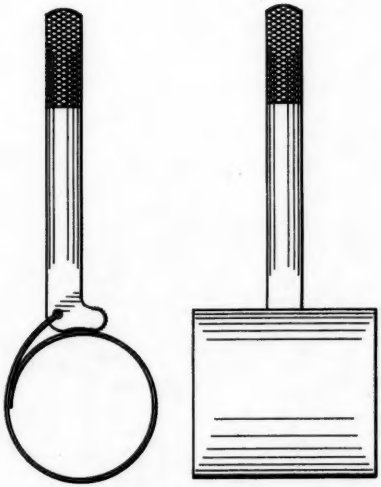


314,892
CHOPPING BOARD
Shigenori Sata, Osaka, Japan, assignor to Kobayashi Manufacturing Company, Ltd., Osaka, Japan
Filed Dec. 22, 1988, Ser. No. 288,719
Term of patent 14 years
U.S. Cl. D7—698

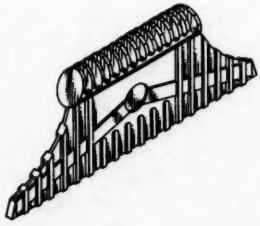
314,893
TOOL FOR REPAIRING A BREAK IN GLASS
William A. Jones, 7197½ NW. 16, Bethany, Okla. 73008
Filed Aug. 24, 1987, Ser. No. 88,902
Term of patent 14 years
U.S. Cl. D8—14



314,894
DRIVE BELT ADJUSTMENT TOOL
Harold L. Jacobs, 6095 Hillsboro Rd., Davisburg, Mich. 48019
Filed Nov. 7, 1987, Ser. No. 118,640
Term of patent 14 years
U.S. Cl. D8—14

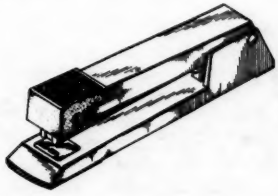


314,895
MASTIC SPREADER OR LIKE ARTICLE
Donald D. Rumpel, Smelterville, Id., assignor to Kellogg Plastics, Ltd., Smelterville, Id.
Filed Dec. 8, 1987, Ser. No. 129,973
Term of patent 14 years
U.S. Cl. D8—14



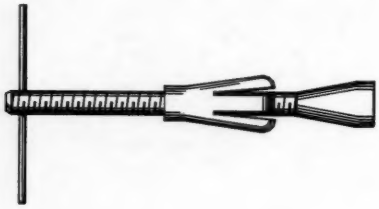
314,896
JAW INSERT FOR POWER TONGS
Charles W. Haynes, Marshall, Tex., assignor to Martin-Decker, Inc.
Filed Oct. 15, 1987, Ser. No. 108,881
Term of patent 14 years
U.S. Cl. D8—22

314,897
STAPLER
Jackson Hung, No. 162-1, Shan Geau Road, Dah Tsuen Hsiang, Changhua Hsien, Taiwan
Filed May 25, 1988, Ser. No. 198,379
Term of patent 14 years
U.S. Cl. D8—50

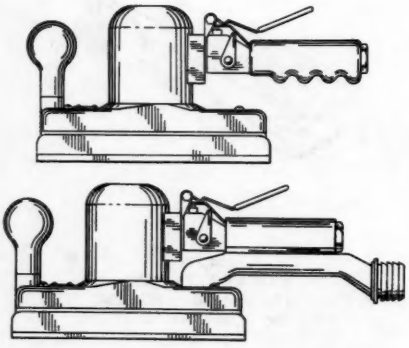


314,898
RAIN GUTTER RAKE
Robert R. Rust, 219 Sixth St., Marysville, Calif. 95901
Filed May 4, 1988, Ser. No. 190,302
Term of patent 14 years
U.S. Cl. D8—51

314,899
ORIFICE TUBE EXPANDER
Don D. Young, P.O. Box 3522, Enloe, Tex. 75441
Filed Nov. 6, 1987, Ser. No. 117,652
Term of patent 14 years
U.S. Cl. D8—59

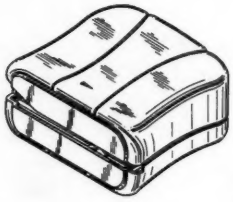


314,900
ABRADING MACHINE
Roger T. Hoffman, Winnebago, Ill., assignor to National-Detroit, Inc., Rockford, Ill.
Filed Oct. 19, 1987, Ser. No. 109,751
Term of patent 14 years
U.S. Cl. D8—62

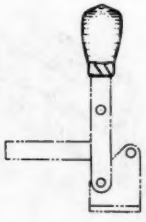


314,901
FENCE WIRE WINDING TOOL
Edd Tackett, Rte. 3, Box 200 A, Huntsville, Ark. 72740, and Yvonne K. Armstrong, P.O. Box 201, Kingston, Ark. 72742
Filed Jun. 10, 1988, Ser. No. 204,790
Term of patent 14 years
U.S. Cl. D8—89

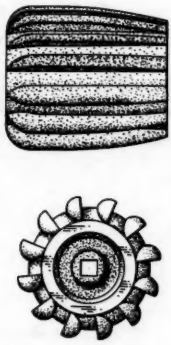
314,902
LETTER OPENER
Harrison Huang, No. 23, Lin Tsuo Road, Shenkang, Taichung Hsien, Taiwan
Filed Dec. 8, 1988, Ser. No. 282,343
Term of patent 14 years
U.S. Cl. D8—102



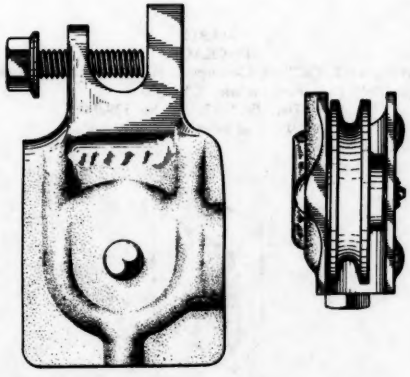
314,903
HANDLE FOR A CLAMP
Douglas Ruffley, Troy, and Gregory Midkiff, Ferndale, both of Mich., assignors to Delaware Capital Formation, Inc., Wilmington, Del.
Filed Apr. 4, 1988, Ser. No. 176,998
Term of patent 14 years
U.S. Cl. D8—310



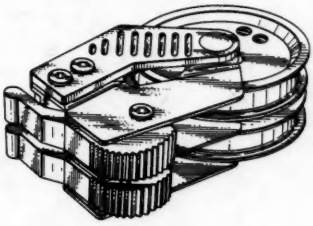
314,904
HANDLE FOR SCUBA EQUIPMENT VALVE OR THE LIKE
Joseph C. Trinkwalder, Jr., North Tonawanda, N.Y., assignor to Harsco Corp., Wormleysburg, Pa.
Filed May 11, 1988, Ser. No. 193,484
Term of patent 14 years
U.S. Cl. D8—312



314,905
RESIDENTIAL WATER WELL PUMP PULLEY
Bruce L. Kehm, R.D.#5, Steel City, Bethlehem, Pa. 18015
Filed Sep. 24, 1987, Ser. No. 105,197
Term of patent 14 years
U.S. Cl. D8—360



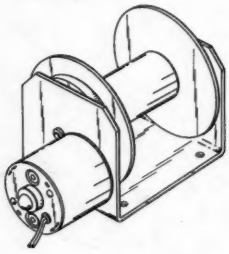
314,906
BOAT TURNING BLOCK
Peter W. Isherwood, Richmond-on-Thames, England, assignor to Offshore Instruments Limited, Cowes, England
Filed Oct. 9, 1987, Ser. No. 107,520
Claims priority, application United Kingdom, Apr. 14, 1987, 1041529
Term of patent 14 years
U.S. Cl. D8—360



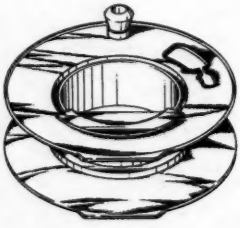
314,907
PERFUME BOTTLE
Stefano Ricci, Florence, Italy, assignor to Battaglia Shops, Inc., Beverly Hills, Calif.
Filed Apr. 6, 1988, Ser. No. 178,081
Term of patent 14 years
U.S. Cl. D9—432

314,908
COMBINED PADLOCK AND HASP PROTECTOR
Jakob B. Pedersen, Hellerup, Denmark, assignor to A/S Ruko, Herlev, Denmark
Filed Nov. 3, 1988, Ser. No. 267,518
Claims priority, application Denmark, May 5, 1988, 589/88
Term of patent 14 years
U.S. Cl. D8—334

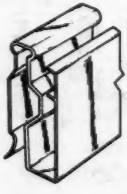
314,909
SKI ROPE REEL OR THE LIKE
Walter A. Schmidt, 3221 Neilson Dr., Enid, Okla. 73703
Filed Sep. 4, 1987, Ser. No. 93,393
Term of patent 14 years
U.S. Cl. D8—358



314,910
CORD STORAGE REEL
Ralph VanSkiver, Arlington, Tex., assignor to Doskocil Manufacturing Company, Inc., Arlington, Tex.
Filed Sep. 25, 1989, Ser. No. 411,609
Term of patent 14 years
U.S. Cl. D8—359

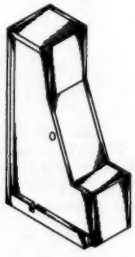


314,911
SUPPORT FOR SIGNAL FLAGS OR THE LIKE
Joseph P. Spica, Livonia, Mich., assignor to The 2500 Corporation, Farmington Hills, Mich.
Filed Jun. 16, 1988, Ser. No. 208,012
Term of patent 14 years
U.S. Cl. D8—373

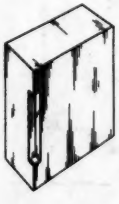


314,912
MATCHBOX
Manuel E. Rey Pascual, Jerez de la Frontera, Spain, assignor to Phosphosherry Corporation S.A., Jerez de la Frontera, Spain
Filed Aug. 17, 1987, Ser. No. 86,671
Claims priority, application Spain, Jun. 9, 1987, 113253
Term of patent 14 years
U.S. Cl. D9—424

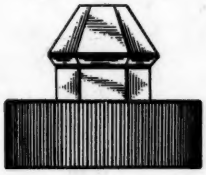
314,913
DECORATIVE BOX
Joseph W. Ferbrache, 990 S. 18th E., Mountain Home, Id. 83647
Filed Dec. 24, 1987, Ser. No. 137,652
Term of patent 14 years
U.S. Cl. D9—430



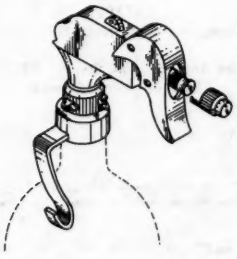
314,914
PACKAGE
Christopher J. Callinan, Centerport, N.Y., assignor to Regent Sheffield, Ltd., Farmingdale, N.Y.
Filed Dec. 29, 1987, Ser. No. 139,048
Term of patent 14 years
U.S. Cl. D9—432



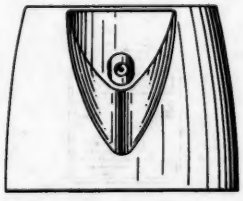
314,915
BOTTLE CLOSURE
Joseph Thompson, Upper Saddle River, N.J., assignor to Sterling Drug Inc., New York, N.Y.
Filed Apr. 25, 1988, Ser. No. 186,072
Term of patent 14 years
U.S. Cl. D9—435



314,916
COMBINED SPRAY HEAD AND BOTTLE CLOSURE
Daniel W. Brooks, 601 N. "N" Pl., Tulare, Calif. 93274
Filed Feb. 19, 1988, Ser. No. 158,154
Term of patent 14 years
U.S. Cl. D9—448

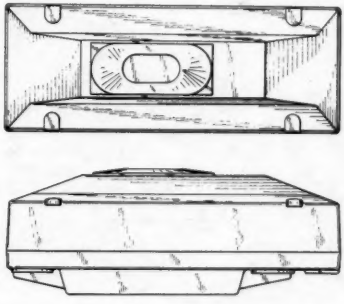


314,917
COMBINED OVERCAP AND AEROSOL ACTUATOR
Joseph Thompson, Upper Saddle River, N.J., assignor to Sterling Drug Inc., Rensselaer, N.Y.
Filed Apr. 25, 1988, Ser. No. 186,071
Term of patent 14 years
U.S. Cl. D9—448

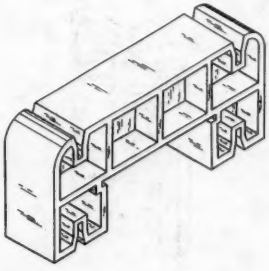


314,918
WRISTWATCH
Jean-Louis Dumas, 24, Rue du Faubourg St., Honore 75008 Paris, France
Filed Jan. 30, 1987, Ser. No. 9,407
Term of patent 14 years
U.S. Cl. D10—32

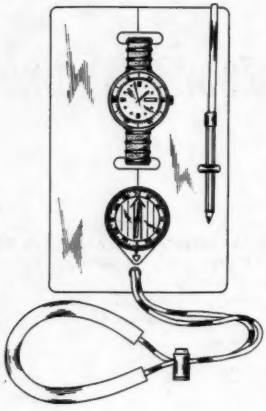
314,919
HOT BOX DETECTOR SCANNER HOUSING
Luis F. Villar, Westbury, N.Y., assignor to Servo Corporation of America, Hicksville, N.Y.
Filed Apr. 4, 1988, Ser. No. 178,071
Term of patent 14 years
U.S. Cl. D10—46



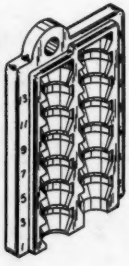
314,920
MASONRY LINE BLOCK
Robert J. Blazek, 4 Greenwood Trails N., Greenwood, Ind. 46142
Filed Nov. 17, 1988, Ser. No. 272,293
Term of patent 14 years
U.S. Cl. D10—61



314,921
NAVIGATIONAL AID
Michael C. Horowitz, 1015 Poplar Dr., Falls Church, Va. 22046
Filed Feb. 17, 1988, Ser. No. 156,561
Term of patent 14 years
U.S. Cl. D10—62

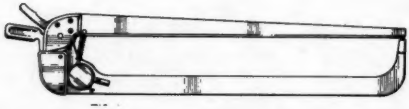


314,922
GOLF TEE DRIVING GAUGE
Robert G. Musillo, 5481 Wolf Dr., Pittsburgh, Pa. 15236
Filed Aug. 10, 1988, Ser. No. 230,502
Term of patent 14 years
U.S. Cl. D10—64



314,923
ULTRASONIC MEASURING INSTRUMENT
Raymond Chan, Hung Hom, Kowloon, Hong Kong, assignor to Integrated Display Technology Limited, Hung Hom, Kowloon, Hong Kong
Filed Jun. 28, 1989, Ser. No. 372,944
Claims priority, application United Kingdom, Jan. 9, 1989, 1056213
Term of patent 14 years
U.S. Cl. D10—70

314,924
CALIPER
Timothy R. Abbott, 309 12th Street, N.E., Childersburg, Ala. 35044
Filed Aug. 15, 1988, Ser. No. 232,573
Term of patent 14 years
U.S. Cl. D10—73



314,925
CIRCUIT TESTER
Bernard J. Murphy, 2335 E. Norris St., Philadelphia, Pa. 19125
Filed Jul. 23, 1987, Ser. No. 76,935
Term of patent 14 years
U.S. Cl. D10—78

314,926

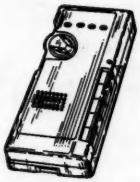
PORTABLE LINE TESTER OR SIMILAR ARTICLE

Leslie I. Sohay, Ventura, Calif., assignor to Harris Corporation, Melbourne, Fla.

Filed Apr. 14, 1989, Ser. No. 339,025

Term of patent 14 years

U.S. Cl. D10—78



314,927

WRIST WATCH DIAL

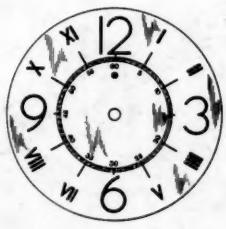
Gedalio Grinberg, New York, N.Y., and Hugo Berger, LeLocle, Switzerland, assignors to North American Watch Corporation, New York, N.Y.

Filed Mar. 25, 1987, Ser. No. 30,818

The portion of the term of this patent subsequent to Aug. 9, 2002, has been disclaimed.

Term of patent 14 years

U.S. Cl. D10—126



314,928

WATCH CROWN

Eddy Schoepfer, La Chaux-du-Milieu, Switzerland, assignor to Fabrique Ebel, Societe Anonyme, La Chaux-de-Fonds, Switzerland

Filed Oct. 19, 1987, Ser. No. 110,474

Claims priority, application Hague, May 13, 1987, DM008636

Term of patent 14 years

U.S. Cl. D10—131

314,929

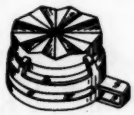
BRACELET OR THE LIKE

Meang Chia, and Cheo Chia, both of Chain & Charm Manufacturers, 412 W. 6th St., Suite #1104, Los Angeles, Calif. 90014

Filed Aug. 22, 1989, Ser. No. 397,094

Term of patent 14 years

U.S. Cl. D11—6



314,930

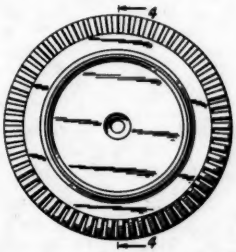
BADGE SHIELD

Thomas R. Freeman, Savage, Minn., assignor to Paragon Classics, Inc., Spring Lake Park, Minn.

Filed Dec. 19, 1988, Ser. No. 285,955

Term of patent 14 years

U.S. Cl. D11—96



314,931

FACSIMILE TRANSCEIVER

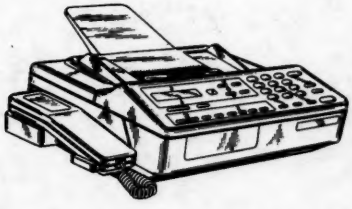
Hajime Takayama; Hidenori Tomachi; Hiroshi Okano; Kiyoshi Asano, all of Kanagawa; Hironosuke Koda, and Munenori Fujimoto, both of Tokyo, all of Japan, assignors to Matsushita Graphic Communication Systems, Inc., Tokyo, Japan

Filed Jun. 16, 1989, Ser. No. 367,514

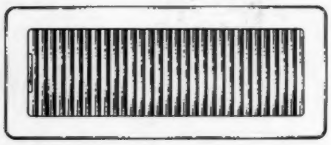
Claims priority, application Japan, Dec. 20, 1988, 63-49517

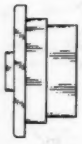
Term of patent 14 years

U.S. Cl. D14—118



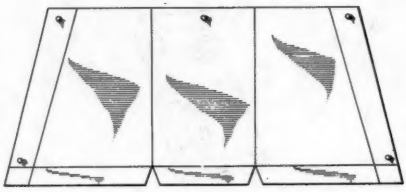
314,932
MOTORCYCLE RADIO COVER
Fred O. Hoese, Bulverde, Tex., assignor to Hoese Corporation, Bulverde, Tex.
Filed Jan. 13, 1988, Ser. No. 143,599
Term of patent 14 years
U.S. Cl. D12—114



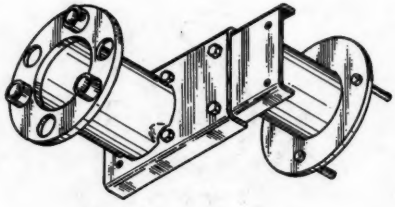


314,933
AUTOMOBILE TIRE
Akihito Goto, and Minoru Nakano, both of Tokyo, Japan, assignors to Bridgestone Corporation, Tokyo, Japan
Filed Apr. 7, 1988, Ser. No. 179,000
Claims priority, application Japan, Oct. 7, 1987, 62-40792
Term of patent 14 years
U.S. Cl. D12—146

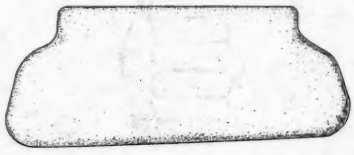
314,934
FOLDABLE VEHICLE WINDSHIELD PROTECTOR
James P. Howes, 33 Cedar Hill, Wilton, Conn. 06897
Filed Apr. 25, 1988, Ser. No. 185,805
Term of patent 14 years
U.S. Cl. D12—155



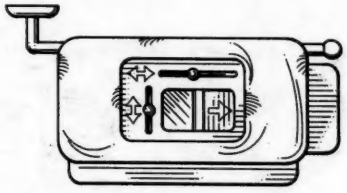
314,935
OFFSET WHEEL AXLE EXTENSION FOR VEHICLE
Roger B. Collins, 10 Kauri Ct., Palm Beach Qld., Australia
Filed Dec. 29, 1987, Ser. No. 139,712
Term of patent 14 years
U.S. Cl. D12—160



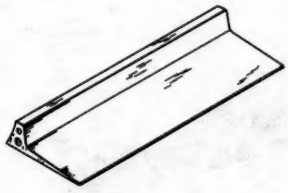
314,936
VISOR
Abdi R. Lawassani, Pontiac, and Mark J. Wasik, Alma, both of Mich., assignors to United Technologies Automotive, Dearborn, Mich.
Filed May 26, 1989, Ser. No. 357,441
Term of patent 14 years
U.S. Cl. D12—191



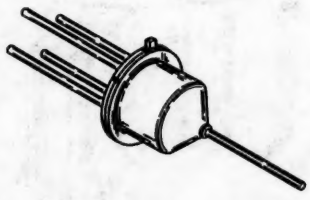
314,937
VEHICLE SUN VISOR
Kathleen D. Adam, P.O. Box 354, Stafford, Va. 22554
Filed Aug. 16, 1989, Ser. No. 394,508
Term of patent 14 years
U.S. Cl. D12—191



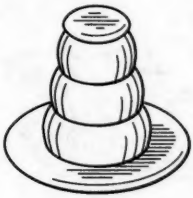
314,938
GARAGE FLOOR CAR STOP
Kenneth W. Anderson, Springfield, Ill., assignor to Anderson Seal Company, Rochester, Ill.
Filed May 12, 1988, Ser. No. 194,011
Term of patent 14 years
U.S. Cl. D12—217



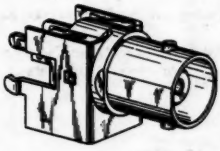
314,939
TILT SWITCH
Leonard P. Tetrault, Northport, and James R. Miller, Center Moriches, both of N.Y., assignors to Aerodyne Controls Corporation, Ronkonkoma, N.Y.
Filed Sep. 28, 1987, Ser. No. 101,765
Term of patent 14 years
U.S. Cl. D13—158



314,940
BATTERY CORROSION ELIMINATOR
Henry Lewis, 3636 Sharpe Ave., Memphis, Tenn. 38411
Filed Nov. 13, 1987, Ser. No. 126,685
Term of patent 14 years
U.S. Cl. D13—119

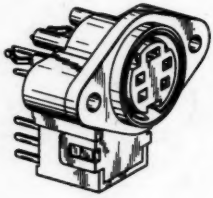


314,941
RF COAXIAL CONNECTOR
Ryusuke Amachi, Nishinomiya, and Masanori Tanaka, Osaka, both of Japan, assignors to Hosiden Electronics Co., Ltd., Osaka, Japan
Filed Mar. 21, 1988, Ser. No. 171,519
Claims priority, application Japan, Sep. 25, 1987, 62-39214
Term of patent 14 years
U.S. Cl. D13—133

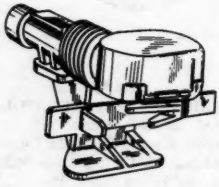


314,942
ELECTRICAL CONNECTOR HOUSING
Kensaku Sato, and Koichi Akiyama, both of Tokyo, Japan, assignors to Hirose Electric Co., Ltd., Tokyo, Japan
Filed Sep. 15, 1987, Ser. No. 96,383
Claims priority, application Japan, Mar. 31, 1987, 62-11974; Mar. 31, 1987, 62-11975; Mar. 31, 1987, 62-11976; Mar. 31, 1987, 62-11977
Term of patent 14 years
U.S. Cl. D13—147

314,943
CONNECTOR SOCKET
Kyousuke Tajima, Gunma, Japan, assignor to Hosiden Electronics Co. Ltd., Osaka, Japan
Filed Feb. 16, 1988, Ser. No. 155,936
Claims priority, application Japan, Aug. 19, 1987, 62-33738
Term of patent 14 years
U.S. Cl. D13—147

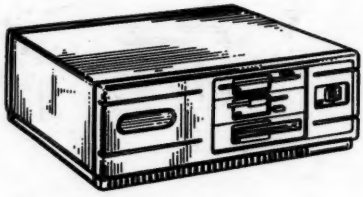


314,944
INTERRUPTER UNIT FOR A SWITCH ASSEMBLY
John Urbanek, Chicago, Ill., assignor to S&C Electric Company, Chicago, Ill.
Filed Jun. 29, 1987, Ser. No. 67,906
Term of patent 14 years
U.S. Cl. D13—160

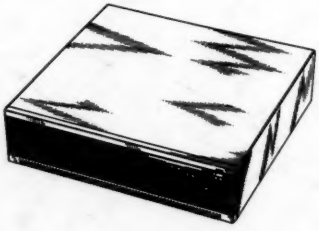


314,945
HEAT SINK
Alfred F. McCarthy, Belmont, N.H., assignor to Aavid Engineering, Inc., Laconia, N.H.
Filed Dec. 9, 1988, Ser. No. 282,290
Term of patent 14 years
U.S. Cl. D13—179

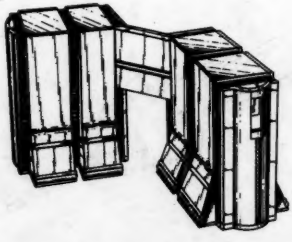
314,946
PERSONAL COMPUTER
Donald S. Goodrich, The Woodlands, Tex., assignor to Compaq Computer Corporation, Houston, Tex.
Filed Jun. 17, 1988, Ser. No. 208,511
Term of patent 14 years
U.S. Cl. D14—100



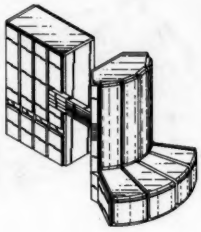
314,947
CENTRAL PROCESSING UNIT FOR A COMPUTER
Tetsuya Imamura, Osaka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Feb. 15, 1990, Ser. No. 481,462
Claims priority, application Japan, Nov. 6, 1989, 1-40422
Term of patent 14 years
U.S. Cl. D14—100



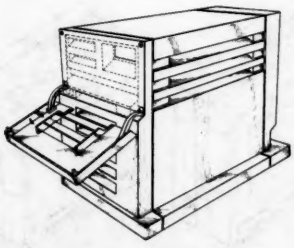
314,948
COMPUTER CABINET
Steven J. Dean, Chippewa Falls; David M. Morton, Eau Claire, both of Wis.; Eugene N. Reshanov, Golden Valley, and Eric J. Mueller, St. Paul, both of Minn., assignors to Cray Research, Inc., Minneapolis, Minn.
Filed Aug. 8, 1989, Ser. No. 391,371
Term of patent 14 years
U.S. Cl. D14—102



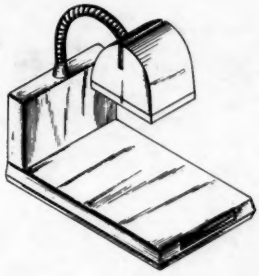
314,949
COMPUTER CABINET
Stephen Cermak, III; Manville A. Hoeft, both of Elk Mound; Lawrence C. Zylka, Menomonie, all of Wis.; Eugene N. Reshanov, Golden Valley, and Eric J. Mueller, St. Paul, both of Minn., assignors to Cray Research, Inc., Minneapolis, Minn.
Filed Oct. 25, 1989, Ser. No. 427,328
Term of patent 14 years
U.S. Cl. D14—102



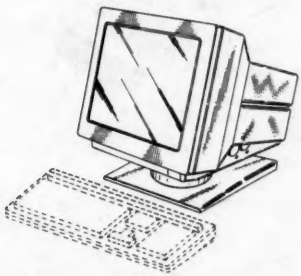
314,950
TWELVE SLOT COMPUTER HOUSING
Tuan T. Vu; Michael J. Lee, both of San Jose; Siamak Salimpour, Danville; Philip G. Yurkonis, Campbell; Herbert Pfeifer, San Jose; Nick Brawne, San Francisco, and Howell Hsiao, Mountain View, all of Calif., assignors to Sun Microsystems, Mountain View, Calif.
Filed Jan. 8, 1990, Ser. No. 461,779
Term of patent 14 years
U.S. Cl. D14—102



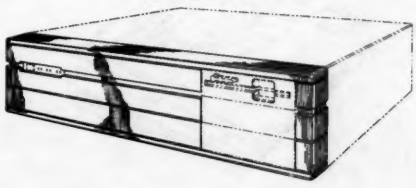
314,951
COUNTERTOP OPTICAL SCANNER WITH CREDIT CARD READER
Jerome Swartz, Old Field, N.Y., assignor to Symbol Technologies, Inc., Bohemia, N.Y.
Filed Mar. 20, 1989, Ser. No. 255,889
Term of patent 14 years
U.S. Cl. D14—107



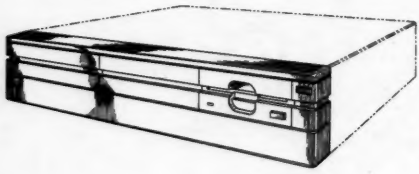
314,952
VIDEO DISPLAY TERMINAL OR SIMILAR ARTICLE
Anthony R. Orchard, Wantagh; Paul Matwey, Mt. Sinai; Lloyd A. Samuels, Kew Garden Hills; Brian K. Fisher, Douglaston, and Robert G. Doherty, Massapequa Park, all of N.Y., assignors to NCR Corporation, Dayton, Ohio
Filed Oct. 21, 1988, Ser. No. 261,642
Term of patent 14 years
U.S. Cl. D14—113



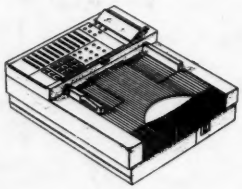
314,953
LARGE CHASSIS COMPUTER BEZEL
Robert A. Welch, Austin, Tex., assignor to Compuadd Corporation, Austin, Tex.
Filed Jul. 20, 1989, Ser. No. 382,574
Term of patent 14 years
U.S. Cl. D14—115



314,954
LOW PROFILE COMPUTER BEZEL
Robert A. Welch, Austin, Tex., assignor to Compuadd Corporation, Austin, Tex.
Filed Jul. 20, 1989, Ser. No. 382,575
Term of patent 14 years
U.S. Cl. D14—115

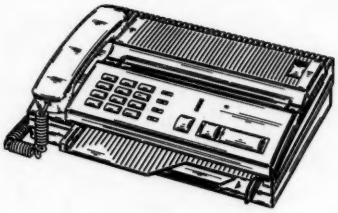


314,955
FACSIMILE TRANSMITTER/RECEIVER
Hiroaki Watanabe, Kawasaki, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan
Filed Jun. 8, 1989, Ser. No. 363,112
Claims priority, application Japan, Dec. 8, 1988, 63-47819
Term of patent 14 years
U.S. Cl. D14—118

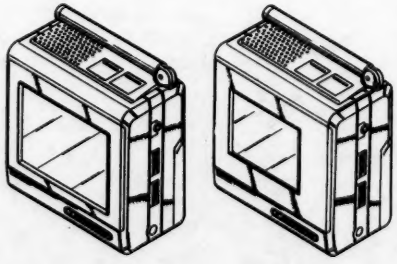


314,956
FACSIMILE
Akira Tsukada, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Jun. 27, 1989, Ser. No. 372,258
Claims priority, application Japan, Dec. 28, 1988, 63-51355
Term of patent 14 years
U.S. Cl. D14—118

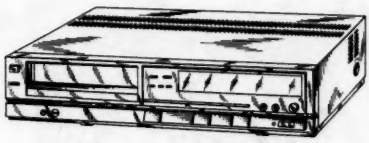
314,957
FACSIMILE
Akira Tsukada, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Sep. 5, 1989, Ser. No. 403,149
Claims priority, application Japan, Mar. 8, 1989, 1-8649
Term of patent 14 years
U.S. Cl. D14—118



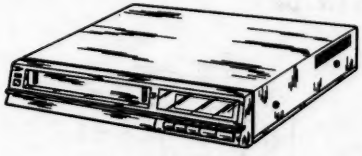
314,958
PORTABLE TELEVISION SET
Akihiro Miyahara, Kunitachi; Hiroshi Nakatsuka, Kokubunji, and Asao Sasaki, Fussa, all of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan
Filed Aug. 11, 1988, Ser. No. 231,541
Claims priority, application Japan, May 6, 1988, 63-17979; May 6, 1988, 63-17978; May 10, 1988, 63-18383; May 10, 1988, 63-18382
Term of patent 14 years
U.S. Cl. D14—126



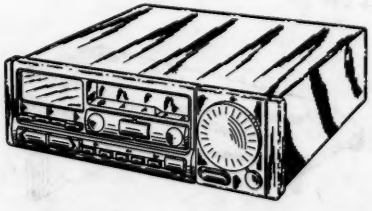
314,959
VIDEO TAPE RECORDER
Kenichiro Kohno, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed May 17, 1988, Ser. No. 195,016
Claims priority, application Japan, Nov. 30, 1987, 62-48966
Term of patent 14 years
U.S. Cl. D14—135



314,960
VIDEO CASSETTE RECORDER
Doo S. Yang, Seoul, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea
Filed Jun. 10, 1988, Ser. No. 205,106
Claims priority, application Rep. of Korea, Dec. 29, 1987, 19605/1987
Term of patent 14 years
U.S. Cl. D14—135

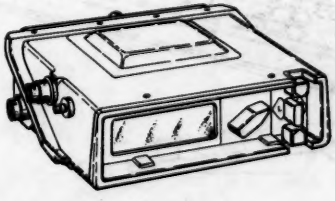


314,961
CAR RADIO RECEIVER
Grant M. N. Davidson, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Jul. 7, 1988, Ser. No. 216,743
Claims priority, application United Kingdom, Jan. 20, 1988, 1047818
Term of patent 14 years
U.S. Cl. D14—157



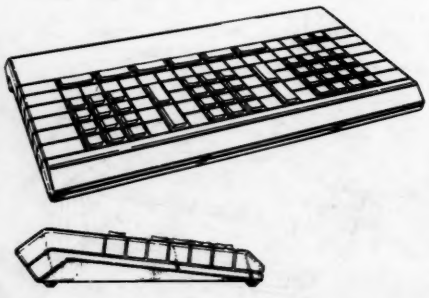
314,962
PUBLIC ADDRESS UNIT
M. Allyson Hilton, Orchard Park, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Dec. 4, 1987, Ser. No. 128,563
Term of patent 14 years
U.S. Cl. D14—185

314,963
CABINET FOR A GLOBAL POSITIONING SYSTEM NAVIGATION RECEIVER
Melvin H. M. Best, Topanga; Valentine L. Denninger, Sunnyvale; John G. Tang, Redwood City; Lynn Weber, Saratoga; Paul K. Janowski, Simi, and Andrew Stavros, San Jose, all of Calif., assignors to Trimble Navigation, Ltd., Sunnyvale, Calif.
Filed Aug. 26, 1988, Ser. No. 237,002
Term of patent 14 years
U.S. Cl. D14—188

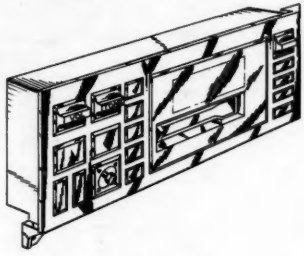


314,964
RADIO RECEIVER
Chanhong Chung, Seoul, Rep. of Korea, assignor to Myoung Jung Electronics Co., Ltd., Seoul, Rep. of Korea
Filed Nov. 10, 1988, Ser. No. 269,950
Term of patent 14 years
U.S. Cl. D14—192

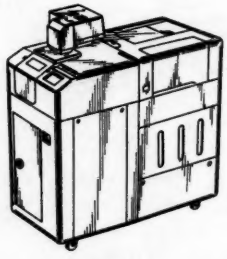
314,965
TELEPHONE CONSOLE
Carlton M. Langton, Nottinhham, England, assignor to GEC Plessey Telecommunications Limited, Coventry, England
Filed Jul. 13, 1989, Ser. No. 379,445
Claims priority, application United Kingdom, Jan. 19, 1989, 1056484
Term of patent 14 years
U.S. Cl. D14—241



314,966
CONTROL UNIT FOR A COMBINED CAR RADIO RECEIVER CASSETT PLAYER AND DIGITAL CLOCK
Andrew D. Magic, Livonia, Mich.; Frank H. Klein, Huntsville, Ala.; Gilbert L. McCauley, Detroit, and Thomas C. Slanec, Grosse Pointe Woods, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.
Filed Apr. 14, 1988, Ser. No. 185,766
Term of patent 14 years
U.S. Cl. D14—258

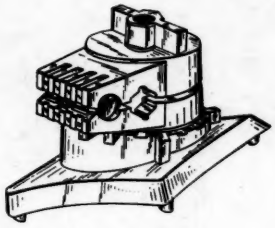


314,967
PRINTER PROCESSOR FOR MAKING PHOTOGRAPHIC PRINTS
Mikio Takahashi, and Masahiro Fukuda, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan
Filed Mar. 17, 1988, Ser. No. 169,356
Claims priority, application Japan, Sep. 18, 1987, 62-38091
Term of patent 14 years
U.S. Cl. D16—246



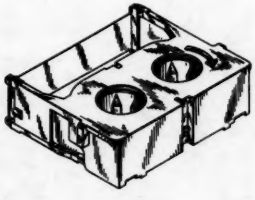
314,968
SOUND REVERBERATOR FOR STRING MUSICAL INSTRUMENT
Roberto Aspri; Claude Maufette, and Michel Dallaire, all of Montreal, Canada, assignors to Les Entreprises Roberto Aspri Ltee, Montreal, Canada
Filed May 16, 1988, Ser. No. 196,092
Term of patent 14 years
U.S. Cl. D17—20

314,969
DRUM SPUR HOLDER
Masamichi Nakayama, Nagoya, and Yoshiki Hoshino, Owariasahi, both of Japan, assignors to Hoshino Gakki Co., Ltd., Japan
Filed Feb. 5, 1987, Ser. No. 11,229
Term of patent 14 years
U.S. Cl. D17—22

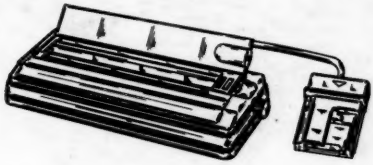


314,970
CASH REGISTER
Maki Tomoike, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Apr. 5, 1989, Ser. No. 334,117
Term of patent 14 years
U.S. Cl. D18—4

314,971
INK RIBBON CARTRIDGE
Osamu Nakamura; Masahiro Kamijo, and Masahiro Fujii, all of Suwa, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan
Filed May 11, 1988, Ser. No. 192,818
Claims priority, application Japan, Nov. 30, 1987, 62-49064
Term of patent 14 years
U.S. Cl. D18—12

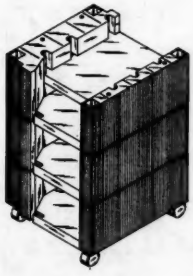


314,972
COMBINED PRINTER AND PLUG FOR WORD PROCESSOR
Kazumi Osaka; Shinsaku Hino, and Tatsumi Wada, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Nov. 15, 1988, Ser. No. 271,771
Claims priority, application Japan, May 16, 1988, 63-19329
Term of patent 14 years
U.S. Cl. D18—13



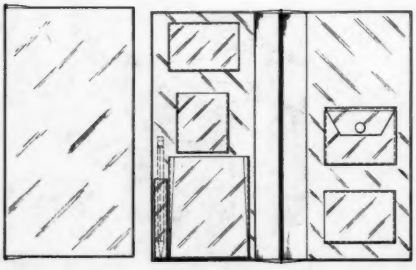
314,973
INK CARTRIDGE FOR PRINTER
Ei Yamamoto, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jul. 19, 1988, Ser. No. 221,177
Claims priority, application Japan, Jan. 22, 1988, 63-2206
Term of patent 14 years
U.S. Cl. D18—22

314,974
PRINTER STAND
Stephen Peart, 21116 Locust Dr., Los Gatos, Calif. 95031
Filed Oct. 17, 1989, Ser. No. 423,122
Term of patent 14 years
U.S. Cl. D18—23

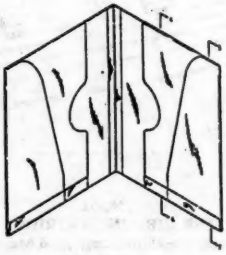


314,975
COPYING MACHINE
Yoshie Katada, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Feb. 19, 1988, Ser. No. 158,152
Claims priority, application Japan, Aug. 21, 1987, 62-34245
Term of patent 14 years
U.S. Cl. D18—37

314,976
ORGANIZER FOR RACING FORM AND OTHER ITEMS
Isidoro Loredo, 1067 Parkside Ave., Manteca, Calif. 95336
Filed Dec. 28, 1988, Ser. No. 291,195
Term of patent 14 years
U.S. Cl. D19—26

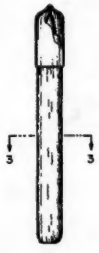


314,977
FOLDER
Jon R. Wyant, Spring Valley, Ohio, assignor to The Mead Corporation, Dayton, Ohio
Filed Mar. 6, 1989, Ser. No. 319,230
Term of patent 14 years
U.S. Cl. D19—27

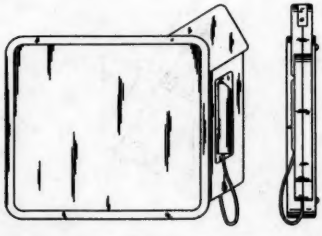


314,978
WRITING INSTRUMENT
Shigeo Oka, Numabukuro, Japan, assignor to Pentel Kabushiki Kaisha, Tokyo, Japan
Filed Dec. 22, 1987, Ser. No. 136,639
Term of patent 14 years
U.S. Cl. D19—48

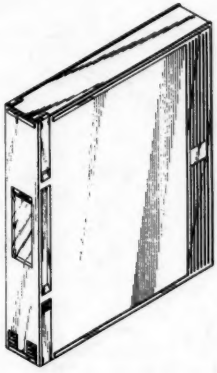
314,979
WRITING INSTRUMENT
Michael H. Gonzales, 806 Sladkey Ave., Mountain View, Calif. 94040
Filed Nov. 13, 1987, Ser. No. 119,987
Term of patent 14 years
U.S. Cl. D19—51



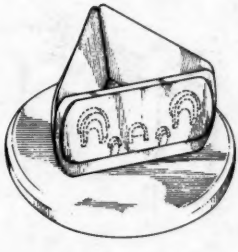
314,980
ELECTRONIC LEARNING AID
Donny Leung, Tai Koo Sing, Hong Kong, assignor to Video Technology Industries, Inc., Wheeling, Ill.
Filed Apr. 15, 1988, Ser. No. 182,316
Claims priority, application United Kingdom, Oct. 28, 1987, 1,045,904
Term of patent 14 years
U.S. Cl. D19—60



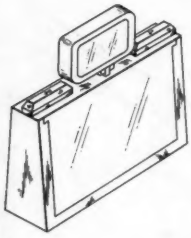
314,981
FILE BOX
H. Charles Hassel, Los Angeles, Calif., assignor to MicroComputer Accessories, Inc., Los Angeles, Calif.
Filed Nov. 5, 1987, Ser. No. 117,647
Term of patent 14 years
U.S. Cl. D19—75



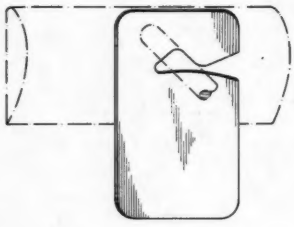
314,982
ROTATING BASE FOR A FILE ASSEMBLY
Mel Evenson, San Pedro, Calif., assignor to Eldon Industries, Inc., Inglewood, Calif.
Filed Oct. 15, 1987, Ser. No. 108,976
Term of patent 14 years
U.S. Cl. D19—99



314,983
EMERGENCY SIGN
Joe Cangianni, 306 5th St., Mamaroneck, N.Y. 10543, and Jesse L. Colodner, Pearl River, N.Y., assignors to Joe Cangianni, Mamaroneck, N.Y.
Filed Apr. 4, 1988, Ser. No. 176,993
Term of patent 14 years
U.S. Cl. D20—10



314,984
HANGTAG
David J. Hass, 9 Margret Ann La., Suffern, N.Y. 10901
Filed Feb. 4, 1988, Ser. No. 152,058
Term of patent 14 years
U.S. Cl. D20—22

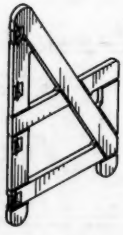


314,985
GAME TABLE
Alain Monneret, Voiteur, France, assignor to Monneret Jouets, Lons-Le-Saunier, France
Filed Aug. 3, 1988, Ser. No. 227,916
Claims priority, application World Int. Prop. O., Feb. 12, 1988, DM/010,254
Term of patent 14 years
U.S. Cl. D21—11

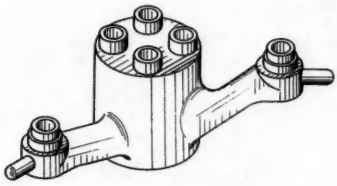
314,986
TOY SAXOPHONE
Takehiko Takahashi; Yoshiyasu Ishii, and Taira Hanashima, all of Tokyo, Japan, assignors to Combi Co., Ltd., Tokyo, Japan
Filed Jun. 29, 1988, Ser. No. 212,860
Claims priority, application Japan, Jan. 7, 1988, 63-214
Term of patent 14 years
U.S. Cl. D21—64

314,987
TOY KITE
John J. Kovats, Fernandina Beach, Fla., assignor to Space Adventures, Inc., Fernandina Beach, Fla.
Filed Dec. 27, 1988, Ser. No. 289,782
Term of patent 14 years
U.S. Cl. D21—89

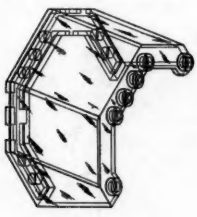
314,988
TOY GATE
Flemming H. Olsen, Espergaerde, Denmark, assignor to Interlego AG, Switzerland
Filed Nov. 29, 1989, Ser. No. 442,923
Term of patent 14 years
U.S. Cl. D21—108



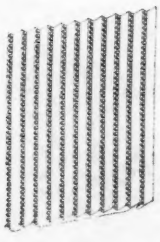
314,989
TOY TREE ELEMENT
Flemming H. Olsen, Espergaerde, Denmark, assignor to Interlego A.G., Switzerland
Filed Nov. 29, 1989, Ser. No. 442,926
Term of patent 14 years
U.S. Cl. D21—108



314,990
TOY BUILDING ELEMENT
Arne Refsing, Billund, Denmark, assignor to Interlego A.G., Switzerland
Filed Nov. 29, 1989, Ser. No. 442,927
Term of patent 14 years
U.S. Cl. D21—108

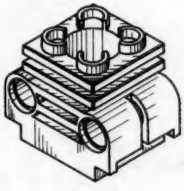


314,991
TOY BUILDING ELEMENT
Jan Ryaa, Billund, Denmark, assignor to Interlego A.G., Switzerland
Filed Nov. 29, 1989, Ser. No. 442,928
Claims priority, application Denmark, Sep. 28, 1989, MA11911989
Term of patent 14 years
U.S. Cl. D21—108

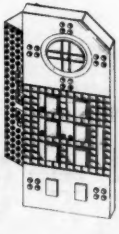


314,992
TOY GHOST
Stig Spangsberg, Vejle, Denmark, assignor to Interlego A.G., Switzerland
Filed Nov. 29, 1989, Ser. No. 442,929
Term of patent 14 years
U.S. Cl. D21—108

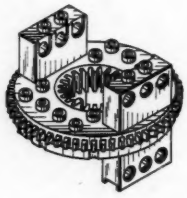
314,993
TOY BUILDING ELEMENT
Jan Hatting, and Ole V. Poulsen, both of Vejle, Denmark, assignors to Interlego A.G., Switzerland
Filed Nov. 29, 1989, Ser. No. 442,930
Term of patent 14 years
U.S. Cl. D21—108



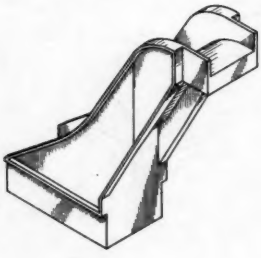
314,994
TOY CONTROL PANEL ELEMENT
Ole V. Poulsen, Vejle, Denmark, assignor to Interlego A.G., Switzerland
Filed Nov. 29, 1989, Ser. No. 442,931
Term of patent 14 years
U.S. Cl. D21—108



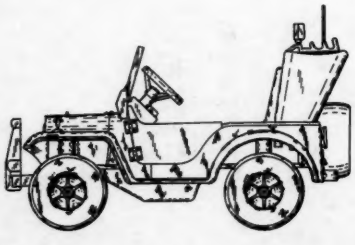
314,995
TOY BUILDING ELEMENT
Ole V. Poulsen, and Jan Hatting, both of Vejle, Denmark, assignors to Interlego A.G., Switzerland
Filed Nov. 29, 1989, Ser. No. 442,932
Term of patent 14 years
U.S. Cl. D21—108



314,996
TOY CONSTRUCTION PIECE SIMULATING A CHUTE
Flemming H. Olsen, Espergaerde, Denmark, assignor to Interlego AG, Switzerland
Filed Nov. 29, 1988, Ser. No. 277,917
Term of patent 14 years
U.S. Cl. D21—109



314,997
TOY VEHICLE WITH CANOPY
Lawrence R. Harrod, Fort Wayne, Ind., assignor to Kransco, San Francisco, Calif.
Filed Jul. 13, 1989, Ser. No. 379,532
Term of patent 14 years
U.S. Cl. D21—134



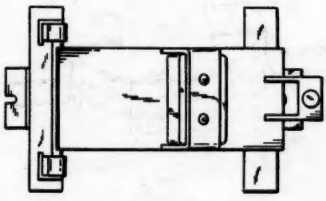
314,998
TOY TRUCK
Ib H. Berggren, Vedbaek, Denmark, assignor to Interlego AG, Switzerland
Filed Nov. 29, 1989, Ser. No. 442,925
Term of patent 14 years
U.S. Cl. D21—134

314,999
MOTOR DRIVEN TOY FLOWER
Isamu Kataoka, Ichikawa, Japan, assignor to Takara Co., Ltd., Tokyo, Japan
Filed Mar. 3, 1989, Ser. No. 318,355
Claims priority, application Japan, Dec. 27, 1988, 63-51444
Term of patent 14 years
U.S. Cl. D21—150

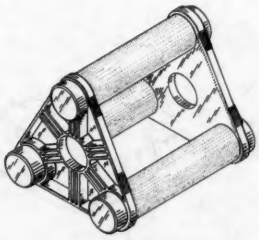
315,000
TOY MONKEY
Christian Stephensen, Marstal, and Jacob Nielsen, Copenhagen, both of Denmark, assignors to Interlego AG, Switzerland
Filed Nov. 29, 1989, Ser. No. 443,225
Term of patent 14 years
U.S. Cl. D21—156

315,001
SNOWMAN ACCESSORY KIT
Earle C. Bennett, 48 N. Third Ave., Ilion, N.Y. 13357
Filed Mar. 11, 1988, Ser. No. 166,609
Term of patent 14 years
U.S. Cl. D21—189

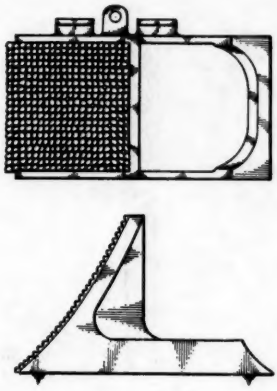
315,002
FOOT PRESS
Larry M. Ward, 331 S. Jasper St., Olney, Ill. 62450
Filed Mar. 14, 1988, Ser. No. 168,322
Term of patent 14 years
U.S. Cl. D21—191



315,003
DUMBBELL
David Huang, 424, Sec. 2, Yuan Lu Rd., Shi Szu Village, Fu Shin Hsiang, Changhua, Taiwan
Filed Mar. 3, 1988, Ser. No. 164,375
Claims priority, application Taiwan, Sep. 21, 1987, 76305752
Term of patent 14 years
U.S. Cl. D21—197



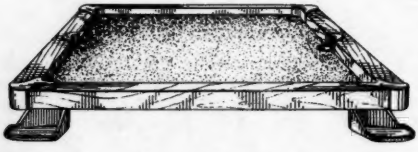
315,004
FOOT SUPPORT BLOCK FOR RUNNER
Milton A. Newton, Jr., 196 Prospect St., Desert Hot Springs, Calif. 92246
Filed Jan. 12, 1988, Ser. No. 143,144
Term of patent 14 years
U.S. Cl. D21—199



315,005
GOLF PUTTER HEAD
Karsten Solheim, Phoenix, Ariz., assignor to Karsten Manufacturing Corporation, Phoenix, Ariz.
Filed Mar. 21, 1988, Ser. No. 170,460
Term of patent 14 years
U.S. Cl. D21—219

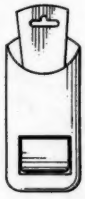
315,006
GOLF CLUB GRIP
Karsten Solheim, Phoenix, Ariz., assignor to Karsten Manufacturing Corporation, Phoenix, Ariz.
Filed Mar. 7, 1988, Ser. No. 164,989
Term of patent 14 years
U.S. Cl. D21—222

315,007
GAME TABLE
Alain Monneret, Voiteur, France, assignor to Monneret Jouets, Lons-Le-Saunier, France
Filed Aug. 3, 1988, Ser. No. 227,914
Term of patent 14 years
U.S. Cl. D21—232

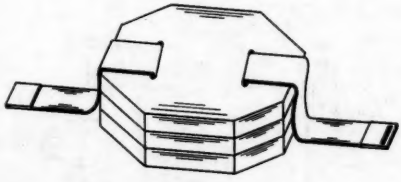


315,008
GOLF TEE HOLDING BAG TAG
Frank J. Popovits, 11707 South Carolyn La., Alsip, Ill. 60658
Filed May 26, 1988, Ser. No. 198,917
Term of patent 14 years
U.S. Cl. D21—234

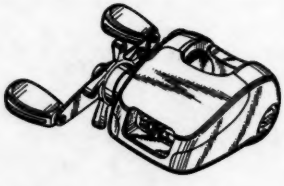
315,009
COMBINED GOLF TOOL AND COIN HOLDER
Albert A. Ingalls, 36 Rivermount Terr., Burlington, Vt. 05401
Filed Jun. 23, 1988, Ser. No. 210,122
Term of patent 14 years
U.S. Cl. D21—234



315,010
FLOTATION DEVICE
Debra A. Stevens, 523 Renny Ave., Idaho Falls, Id. 83401
Filed Oct. 11, 1988, Ser. No. 255,418
Term of patent 14 years
U.S. Cl. D21—238

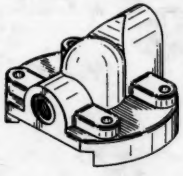


315,011
FISHING REEL
Yasuhisa Kameda, and Shinichi Asano, both of Musashino, Japan, assignors to Daiwa Seiko, Inc., Tokyo, Japan
Filed Dec. 20, 1988, Ser. No. 286,766
Claims priority, application Japan, Jun. 28, 1988, 63-25633
Term of patent 14 years
U.S. Cl. D22—140

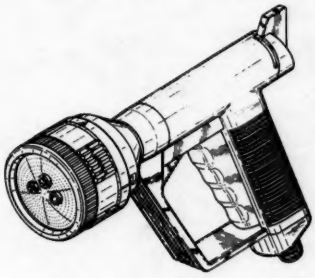


315,012
FISHING ROD HOLDER
Howard D. Koga, 2110 N. Poinsettia St., Santa Ana, Calif. 92706
Filed Nov. 28, 1988, Ser. No. 277,048
Term of patent 14 years
U.S. Cl. D22—147

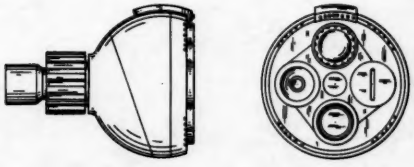
315,013
HEAD FOR A QUICK-CHANGE FILTER CARTRIDGE
Raymond M. Petrucci, Middlebury; Bruce G. Taylor, Kensington; Edward C. Giordano, Manchester, all of Conn.; James M. Padilla, Covina Heights, and Carl Palmer, La Habra Heights, both of Calif., assignors to Cuno Incorporated, Meriden, Conn.
Division of Ser. No. 128,505, Dec. 3, 1987, Pat. No. Des. 306,755, which is a continuation-in-part of Ser. No. 822,549, Jan. 27, 1986, abandoned. This application Sep. 26, 1989, Ser. No. 412,871
Term of patent 14 years
U.S. Cl. D23—209



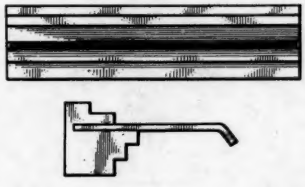
315,014
SPRAYER
Franco Clivio, Zurich, Switzerland, assignor to Gardena Kress & Kastner GmbH, Fed. Rep. of Germany
Filed Feb. 10, 1988, Ser. No. 155,000
Term of patent 14 years
U.S. Cl. D23—226



315,015
WALL MOUNTED SHOWER HEAD
Francois Geneve; Luc Heiligenstein, and Stephen Melamed, all of Chicago, Ill., assignors to Associated Mills, Inc., Chicago, Ill.
Filed Mar. 6, 1989, Ser. No. 319,647
Term of patent 14 years
U.S. Cl. D23—229

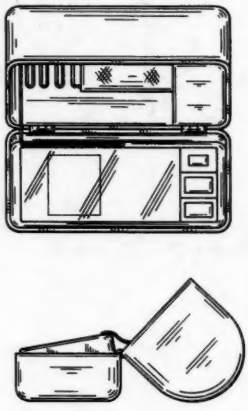


315,016
SPOUT
Regina Razumov, San Diego, Calif., assignor to Harden Industries, Inc., Los Angeles, Calif.
Filed Apr. 5, 1988, Ser. No. 178,079
Term of patent 14 years
U.S. Cl. D23—255



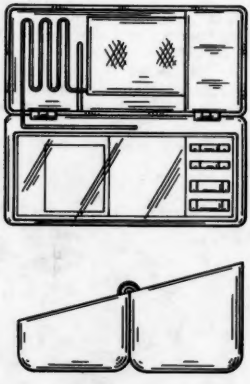
315,017
COMBINED WATER CLOSET AND SEAT
Jean-Philippe Lenclos, Paris, France, assignor to Produits Ceramiques de Touraine, Selles-sur-Cher, France
Filed Apr. 21, 1987, Ser. No. 41,741
Claims priority, application France, Oct. 21, 1986, 865.510
Term of patent 14 years
U.S. Cl. D23—301

315,019
SPHYGMOMANOMETER
Hiroshi Sakaguchi, and Masaki Kawamura, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Feb. 25, 1988, Ser. No. 160,491
Claims priority, application Japan, Aug. 27, 1987, 62-35004
Term of patent 14 years
U.S. Cl. D24—21

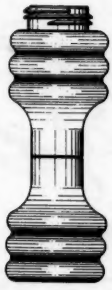


315,018
PORTABLE ELECTRICAL FAN
Jui-Shang Wang, Taipei, Taiwan, assignor to Duracraft Corporation, Sudbury, Mass.
Filed Aug. 9, 1989, Ser. No. 390,992
Term of patent 14 years
U.S. Cl. D23—382

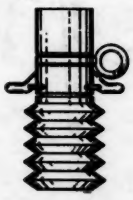
315,020
SPHYGMOMANOMETER
Hiroshi Sakaguchi, and Masaki Kawamura, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Feb. 25, 1988, Ser. No. 162,343
Claims priority, application Japan, Aug. 27, 1987, 62-35005
Term of patent 14 years
U.S. Cl. D24—21



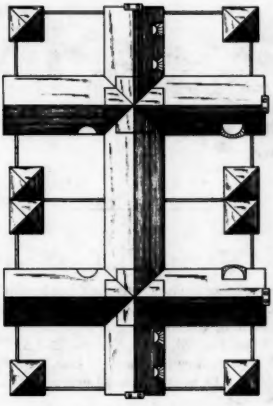
315,021
BABY BOTTLE
Michael A. Frosceno, 1447 SW. 32nd Ct., Ft. Lauderdale, Fla. 33315; Rolando Diaz, 9700 SW. 144 St., Miami, Fla. 33176, and Phillip D. Lucas, 10260 SW. 144 St., Miami, Fla. 33186
Filed Apr. 18, 1988, Ser. No. 182,747
Term of patent 14 years
U.S. Cl. D24—47



315,022
APPLICATOR FOR INJECTING MEDICAMENT INTO COW TEATS
Michael P. Corby, 19 Swinton Rise, Ravenshead, Nottinghamshire, England (NH15 9FS)
Filed Jun. 24, 1988, Ser. No. 213,971
Claims priority, application United Kingdom, Dec. 24, 1987, 1047389
Term of patent 14 years
U.S. Cl. D24—63

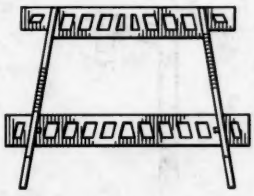


315,023
DUAL CRUCIFORM STRUCTURE
Louis J. Jenn, Indianapolis, Ind., assignor to Atrium Structures, Inc., Indianapolis, Ind.
Filed Mar. 28, 1988, Ser. No. 172,782
The portion of the term of this patent subsequent to Feb. 13, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D25—17

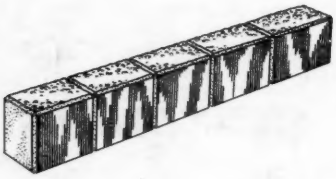


315,024
DECORATIVE CEILING ARCH
Jonathan Grey, Midhurst, England, assignor to Smallbone plc, Reading, England
Filed Dec. 18, 1987, Ser. No. 134,894
Claims priority, application United Kingdom, Jun. 19, 1987, 1043006
Term of patent 14 years
U.S. Cl. D25—58

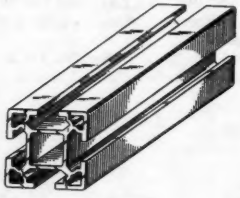
315,025
COLLAPSIBLE SAWHORSE
Craig Hall, 110 East Ave., Akron, N.Y. 14001
Filed Sep. 2, 1988, Ser. No. 239,975
Term of patent 14 years
U.S. Cl. D25—67



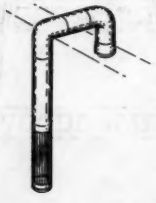
315,026
MOLDED CURB-STONE
Bertin Castonguay, Nuns' Island, and Alain Ratte, Terrebonne, both of Canada, assignors to Groupe Permacon Inc., Ville d'Anjou, Canada
Filed Jul. 21, 1989, Ser. No. 382,958
Claims priority, application Canada, Jun. 1, 1989, 01-06-89-2
Term of patent 14 years
U.S. Cl. D25—113



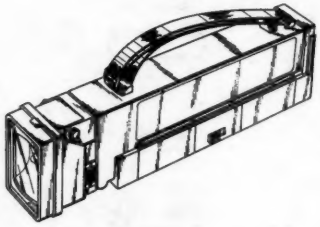
315,027
BEAM
Goran Abbestam, Gothenburg, and Leif Lachonius, Surte, both of Sweden, assignors to SKF Specialty Products AB, Gothenburg, Fed. Rep. of Germany
Filed Jun. 20, 1989, Ser. No. 368,527
Claims priority, application Sweden, Dec. 21, 1988, 882944
Term of patent 14 years
U.S. Cl. D25—124



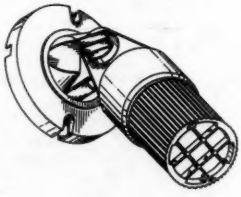
315,028
SUBMERSIBLE POOL LIGHT
Rick D. Grant, Vancouver; Wayne E. Moore, Yacolt; Tom J. Penman, Vancouver, and Ronald K. Truscott, Brush Prairie, all of Wash., assignors to O'Ryan Industries, Vancouver, Wash.
Filed May 14, 1987, Ser. No. 49,455
Term of patent 14 years
U.S. Cl. D26—24



315,029
PORTABLE FLUORESCENT LAMP
Cheng L. Kwan, Kowloon, Hong Kong, assignor to Hang Tjuk Industrial Co., Ltd., Kowloon, Hong Kong
Filed Mar. 20, 1987, Ser. No. 28,333
Claims priority, application United Kingdom, Dec. 3, 1986, 1038503
Term of patent 14 years
U.S. Cl. D26—42

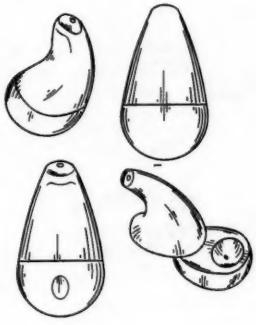


315,030
MINI-SPOTLIGHT
Richard H. Jacobs, Roseville; Ronald T. Keagle, Spring Park, both of Minn.; Gerald E. Peterson, Riverside, Calif., and Robert W. Beachy, St. Paul, Minn., assignors to The Toro Company, Minneapolis, Minn.
Filed Nov. 14, 1988, Ser. No. 271,147
Term of patent 14 years
U.S. Cl. D26—63

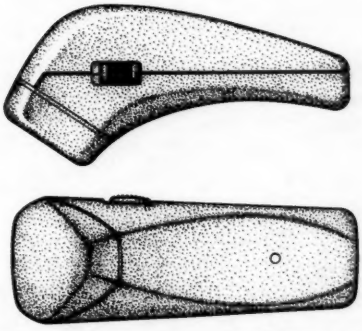


315,031
TORCHIERE
Richard D. Berry, Jr., Hickory, N.C., assignor to Design Institute America, Inc., Montpelier, Ohio
Filed Mar. 7, 1989, Ser. No. 319,671
Term of patent 14 years
U.S. Cl. D26—105

315,032
PIPE
Kiel R. Hayes, 17 Peyton St., Emporia, Kans. 66801
Filed Jun. 26, 1989, Ser. No. 371,595
Term of patent 14 years
U.S. Cl. D27—163



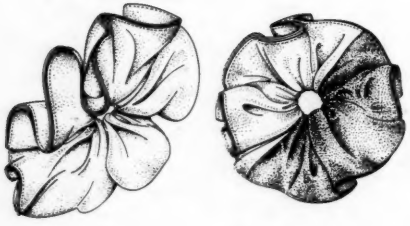
315,034
HOUSING FOR A DEPILATOR
Avner Platek, Tel-Aviv, Israel, assignor to Crestmoore Ltd., Jersey, Channel Islands
Filed Apr. 20, 1989, Ser. No. 340,595
Term of patent 14 years
U.S. Cl. D28—10



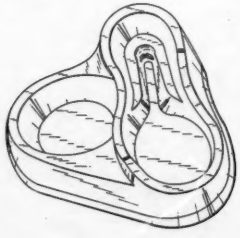
315,033
APPLICATOR FOR LOTIONS
Gloria A. Carugati, 21921 Elkwood St., Canoga Park, Calif. 91304
Filed Feb. 18, 1988, Ser. No. 156,947
Term of patent 14 years
U.S. Cl. D28—7

315,035
HAIR DRYER UNIT
Sharon D. Tucker, 3300 6th St., Apt. 201, Washington, D.C. 20032
Filed Aug. 9, 1988, Ser. No. 231,994
Term of patent 14 years
U.S. Cl. D28—12

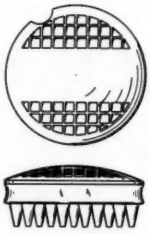
315,036
HAIRBAND
Lynnabeth Leopold, 390 Oak Ave. "DD" , Carlsbad, Calif. 92008
Filed Jun. 30, 1988, Ser. No. 214,101
Term of patent 14 years
U.S. Cl. D28—41



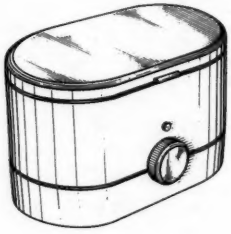
315,037
COMBINED AUTOMATIC PET WATERER AND FEEDER
Fred C. Clark, Arlington, Tex., assignor to Lot-A-Wata, Inc., Arlington, Tex.
Filed Mar. 14, 1989, Ser. No. 323,553
The portion of the term of this patent subsequent to Mar. 14, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D30—122



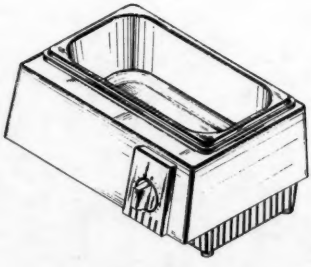
315,038
BRUSH FOR ANIMALS
Fletcher C. Strickler, 12610 LaGrange Rd., Louisville, Ky. 40245
Filed Sep. 5, 1989, Ser. No. 403,156
Term of patent 14 years
U.S. Cl. D30—158



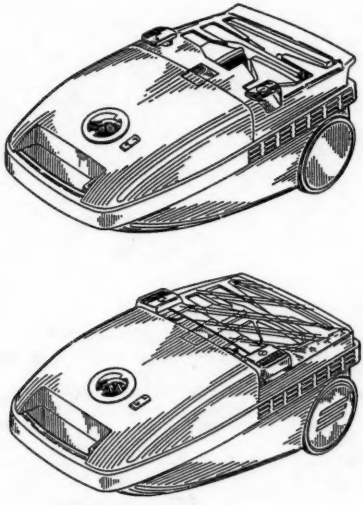
315,039
HOUSING FOR A MULTIPURPOSE ULTRASONIC CLEANER
Brent J. Wortham, 510 Pembrook Dr., Pasadena, Calif. 91107
Filed Apr. 25, 1988, Ser. No. 185,930
Term of patent 14 years
U.S. Cl. D32—1



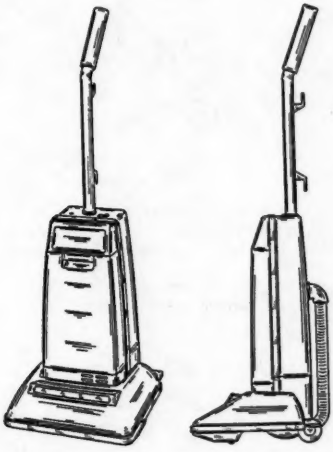
315,040
ULTRASONIC CLEANING MACHINE
Alan Miller, New York, N.Y., assignor to Ipco Corp., White Plains, N.Y.
Filed Dec. 20, 1988, Ser. No. 287,991
Term of patent 14 years
U.S. Cl. D32—1



315,041
VACUUM CLEANER
Sidney H. Bradd, Solon, Ohio, assignor to The Hoover Company, North Canton, Ohio
Filed Jun. 28, 1989, Ser. No. 372,939
Term of patent 14 years
U.S. Cl. D32—21



315,042
VACUUM CLEANER
Matafumi Ikeda, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Oct. 24, 1989, Ser. No. 426,089
Claims priority, application Japan, Apr. 25, 1989, 1-15668
Term of patent 14 years
U.S. Cl. D32—22



315,043

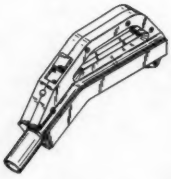
CENTRAL VACUUM SYSTEM HOSE HANDLE

Theodore R. Hayden, 10291 Springhill Crescent, Richmond, British Columbia, Canada (V7E 1W7)

Filed Aug. 1, 1988, Ser. No. 226,959

Term of patent 14 years

U.S. Cl. D32—34



315,044

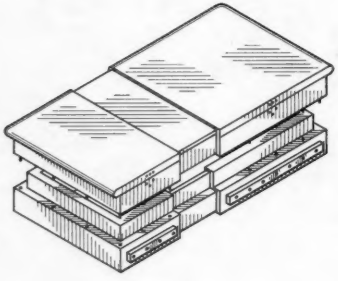
FRAME FOR HOLDING GARBAGE AND TRASH BAGS

Dale R. Hill, 1614 E. Cork St., Apt. 1A, Kalamazoo, Mich. 49001

Filed May 18, 1988, Ser. No. 195,174

Term of patent 14 years

U.S. Cl. D34—10



315,045

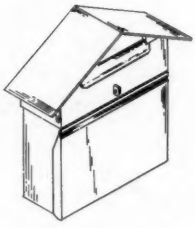
DATA BOX FOR A HOUSE FOR SALE

Cynthia L. Vanaman, 1091 Vessel La., Manahawkin, N.J. 08050

Filed Sep. 12, 1988, Ser. No. 242,502

Term of patent 14 years

U.S. Cl. D99—30



315,046

MODULAR WHEEL CHAIR RAMP UNIT

Lorne Abrams, 339 Wardlaw Avenue, Winnipeg, Manitoba, Canada (R3L 0L5)

Filed Jul. 21, 1987, Ser. No. 75,881

Term of patent 14 years

U.S. Cl. D34—32

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 26TH DAY OF FEBRUARY, 1991

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A.O. Smith Corporation: *See*—
Keeler, Randall W.; and King, James L., 4,996,477, Cl. 324-158.0MG.

Aaltonen, Pirkko: *See*—
Lehtonen, Paavo; Aaltonen, Pirkko; and Karilainen, Ulla, 4,996,062, Cl. 426-8.000.

Abdi, Behrooz L., to Motorola, Inc. Low power peak detector/buffer with fast charge-up time. 4,996,448, Cl. 307-351.000.

Abe, Hirotsugu: *See*—
Ishikawa, Youhei; Hiratsuka, Toshiro; Abe, Hirotsugu; Takagaki, Hisashi; and Yamashita, Sadao, 4,996,506, Cl. 333-219.100.

Abe, Kunihiro: *See*—
Sakamoto, Masanori; Abe, Kunihiro; and Kobayashi, Tomoya, 4,996,643, Cl. 364-424.030.

Abe, Masahide: *See*—
Nishida, Yasuaki; Iino, Yoshiki; Ohtake, Hiroshi; Abe, Masahide; Yoshikawa, Shigeo; Endo, Yukio; Matsunaga, Yoshiyuki; and Harada, Nozomu, 4,996,600, Cl. 358-213.220.

Abe, Masahiro: *See*—
Hirai, Kiyomiki; Takeuchi, Koji; Ito, Nobuo; and Abe, Masahiro, 4,996,286, Cl. 528-123.000.

Abe, Masaki: *See*—
Okado, Akiyoshi; Abe, Masaki; Kagechika, Hiroshi; and Kagaya, Shinichi, 4,996,118, Cl. 428-639.000.

Abe, Takao: *See*—
Koshizuka, Kunihiro; Abe, Takao; Maehashi, Tatsuichi; and Inaba, Yoshihiro, 4,996,093, Cl. 428-212.000.

Abel, Alan D.; Waldron, William E.; and Wells, Theodore F., to Air Products and Chemials, Inc. Control of product withdrawal from a sorptive separation system. 4,995,889, Cl. 55-21.000.

Abraham, Ann: *See*—
Nair, Madhavan G.; and Abraham, Ann, 4,996,207, Cl. 514-258.000.

Abrams, Lionel; Fisher, Arthur; and Jameson, Ronald F., to Lionel Abrams. Cage feeder with novel cage attachment means. 4,995,337, Cl. 119-18.000.

Abrosimov, Vladimir A.; Luzev, Viktor F.; Lyapunov, Vladimir N.; Kuznetsov, Jury N.; Manerov, Vladimir B.; and Skuinsh, Leon M. Method of electromagnetic working of materials. 4,995,730, Cl. 366-273.000.

Ackerman, Joseph J. H.; and Chen, Wei, to Washington University. Magnetic resonance RF probe with electromagnetically isolated transmitter and receiver coils. 4,996,481, Cl. 324-318.000.

Acme Resin Corporation: *See*—
Johnson, Calvin K.; Cooke, Richard C.; and Tse, Kwok-Tuen, 4,996,249, Cl. 523-144.000.

Acosta, Roberto M., to Polioles, S. A. de C.U. Polyol-polyether with high content of ethylene oxide and low viscosity. 4,996,310, Cl. 536-120.000.

Action Products Marketing Corporation: *See*—
Trimble, Carroll O., 4,995,584, Cl. 249-10.000.

Acumeter Laboratories, Inc.: *See*—
McIntyre, Frederic S., 4,996,091, Cl. 428-113.000.

Adachi, Tetsuo: *See*—
Kume, Hitoshi; Kamigaki, Yoshiaki; Adachi, Tetsuo; Tsukada, Toshihisa; Komori, Kazuhiro; Nishimoto, Toshiaki; Muto, Tadashi; and Koizumi, Toshiko, 4,996,571, Cl. 357-23.500.

Adachi, Toshiaki, to Isuzu Motors Limited. Combustion chamber. 4,995,360, Cl. 123-262.000.

Adamich-Saltman, Marina, to Equus Scientific Labs, Inc., West Coast Office. Advanced equine hoof preparation. 4,996,043, Cl. 424-61.000.

Adamovsky, Grigory, to United States of America, National Aeronautics and Space Administration. Fiber optic sensing system. 4,995,697, Cl. 350-96.290.

ADC Telecommunications, Inc.: *See*—
Anton, Mark A.; Steinman, Jory A.; Suek, Paul A.; and Johnson, Wayne A., 4,995,688, Cl. 350-96.100.

Adishian, David; and Silverman, Ira J., to Sequioa Controls Company, Ltd. Bellows valve. 4,995,589, Cl. 251-335.300.

Adler, Howard I.: *See*—
Copeland, James C.; Adler, Howard I.; and Crow, Weldon D., 4,996,073, Cl. 426-487.000.

Adolph Coors Company: *See*—
Sedgeley, William A.; and Moore, Ronald L., 4,995,771, Cl. 414-412.000.

Advanced Micro Devices, Inc.: *See*—
Asghar, Safdar M.; and Bartkowiak, John G., 4,996,528, Cl. 341-110.000.

Aerospatiale Societe Nationale Industrielle: *See*—
Bernard, Louis A.; and Thomassin, Rene , 4,995,574, Cl. 244-17.170.

Agarwal, Vinod K.: *See*—
Wilcox, Philip S.; Nadeau-Dostie, Benoit; and Agarwal, Vinod K., 4,996,691, Cl. 371-68.100.

AGF Manufacturing, Inc.: *See*—
McHugh, George J., 4,995,423, Cl. 137-559.000.

Agoo, Tokinori: *See*—
Saeki, Kenji; Fukuhara, Hiroshi; Agoo, Tokinori; Taguchi, Toru; Miki, Hisaya; Haneda, Yutaka; and Yoshimoto, Sadao, 4,996,372, Cl. 568-717.000.

Agricultural Genetics Company Limited: *See*—
Al-Hakim, Ali H.; and Hull, Roger, 4,996,142, Cl. 435-6.000.

Ahlfors, Seppo: *See*—
Ilmoniemi, Risto; and Ahlfors, Seppo, 4,995,395, Cl. 128-653.00R.

Ahlgren, Aaro, to Sunds Defibrator Rauma Oy. Method and apparatus for thickening a slurry using a compression plate. 4,995,988, Cl. 210-784.000.

Ahlstrom Corporation: *See*—
Ljokkoi, Risto; Niiranen, Tapani; Purho, Pekka; Savolainen, Erkki; and Siitonen, Jari, 4,995,991, Cl. 210-797.000.

Ahrweiler, Karl-Heinz; and Funger, Bernhard, to Eduard Kusters Maschinenfabrik GmbH & Co. KG. Roll having improved transverse end seals. 4,995,147, Cl. 29-116.100.

Aiga, Junji: *See*—
Akita, Kenji; and Aiga, Junji, 4,995,806, Cl. 431-30.000.

Aihara, Katsutoshi: *See*—
Ginnaga, Akihiro; Morokuma, Kazunori; Aihara, Katsutoshi; and Sakoh, Mitsuo, 4,996,299, Cl. 530-409.000.

Aiken, Robert B., Sr. Scrolling sign with improved web guide. 4,995,183, Cl. 40-518.000.

Aikens, Wallace R., to Gulton Industries, Inc. Multi-color illuminating system. 4,996,632, Cl. 362-32.000.

Air Products and Chemials, Inc.: *See*—
Abel, Alan D.; Waldron, William E.; and Wells, Theodore F., 4,995,889, Cl. 55-21.000.

Air Products and Chemicals, Inc.: *See*—
Pierantozzi, Ronald; Miller, Mildred A.; Listemann, Mark L.; Gaffney, Thomas R.; and Coe, Charles G., 4,996,322, Cl. 564-216.000.

Airborne Research Associates, Inc.: *See*—
Markson, Ralph J.; and Anderson, Bruce E., 4,996,473, Cl. 324-72.000.

Aircraft Braking Systems Corporation: *See*—
Moseley, Douglas D.; and Ruof, Edgar J., 4,995,483, Cl. 188-162.000.

Aisin AW Co., Ltd.: *See*—
Hayakawa, Youichi; Kuwayama, Yoshinari; and Yamada, Yoshihiro, 4,995,285, Cl. 74-869.000.

Aisin Hoyo Kabushiki Kaisha: *See*—
Torii, Nozomu, 4,995,653, Cl. 292-216.000.

Aisin Keikinzoku Kabushiki Kaisha: *See*—
Haneda, Shinichi; Terada, Haruhiko; Azuchi, Kazunari; and Gyobu, Kiyohito, 4,996,634, Cl. 362-82.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Haneda, Shinichi; Terada, Haruhiko; Azuchi, Kazunari; and Gyobu, Kiyohito, 4,996,634, Cl. 362-82.000.
Terazawa, Tadashi; Nakashima, Hiroshi; and Taguchi, Yoshinori, 4,995,363, Cl. 123-399.000.
Torii, Nozomu, 4,995,653, Cl. 292-216.000.

Ajinomoto Co., Inc.: *See*—
Hirai, Kiyomiki; Takeuchi, Koji; Ito, Nobuo; and Abe, Masahiro, 4,996,286, Cl. 528-123.000.
Kobayashi, Takaaki; Tosa, Takahumi; Sato, Hiroyuki; Okada, Hiroyoshi; Miyake, Masao; and Mori, Kenji, 4,996,067, Cl. 426-96.000.

Akagawa, Akira: *See*—
Noda, Masahiro; Fuchigami, Masaharu; and Akagawa, Akira, 4,995,997, Cl. 252-49.500.

Akano, Hirofumi; Sato, Takeshi; Okumura, Hajime; Kawamura, Yoshiya; and Shimada, Kyo, to Nakano Vinegar Co., Ltd. Novel foodstuff from soymilk and method for production thereof. 4,996,064, Cl. 426-46.000.

Akasaki, Sayumi: *See*—
Takahashi, Hiroshi; Ohta, Atushi; and Akasaki, Sayumi, 4,996,356, Cl. 562-587.000.

Akashi, Shunji, to Yoshida Kogyo K. K. Security sealing mechanism. 4,995,656, Cl. 292-307.00R.

Akeda, Mamoru: *See*—
Nakamura, Kouji; and Akeda, Mamoru, 4,995,485, Cl. 188-322.170.

Akin, Cavit: *See*—
Joung, John J.; Akin, Cavit; and Royer, Garfield P., 4,996,150, Cl. 435-161.000.

Akita, Kenji; and Aiga, Junji, to Sharp Kabushiki Kaisha. Deodorizing device for oil stoves. 4,995,806, Cl. 431-30.000.

Akita, Noboru: *See*—
Kitahara, Koichi; Shimada, Takashi; Akita, Noboru; Hiramoto, Tadashi; and Sasaki, Kohhei, 4,996,030, Cl. 423-210.000.

Akita, Yukihiro, to Kabushiki Kaisha Pilot. Clip-operated retraction mechanism. 4,995,750, Cl. 401-104.000.

Ako, Hidenobu, to Teijin Seiki Co., Ltd. Directional control valve. 4,995,424, Cl. 137-596.000.

Akutsu, Hidetoshi, to Mitsubishi Metal Corporation. Synchronizer ring in speed variator made of copper-base alloy. 4,995,924, Cl. 148-433.000.

Akutsu, Yoshinori: *See*—
Saho, Takahiro; Akutsu, Yoshinori; Nakano, Takaharu; and Ohtake, Nobumasa, 4,996,280, Cl. 528-15.000.

Akzo America Inc.: *See*—
Greco, Carl C.; and Burk, Johst H., 4,996,300, Cl. 534-15.000.
Mehaffey, Joseph L.; and Newman, Thomas C., 4,995,965, Cl. 209-166.000.

Akzo N.V.: *See*—
van Driessche, Petrus J. D. M., 4,995,967, Cl. 210-94.000.

Al-Hakim, Ali H.; and Hull, Roger, to Agricultural Genetics Company Limited. Non-radioactive nucleic acid hybridization probes. 4,996,142, Cl. 435-6.000.

Albany International Corp.: *See*—
Kositzke, Robert H., 4,995,429, Cl. 139-383.00R.

Alber, Pierre: *See*—
Haase, Henry; Schneider, Joachim; and Alber, Pierre, 4,995,736, Cl. 384-448.000.

Albert-Frankenthal AG: *See*—
Stab, Rudolf, 4,995,858, Cl. 493-445.000.

Albiez, Alfred, to Alfit Gesellschaft m.b.H. Drawer provided with guide means. 4,995,683, Cl. 312-348.400.

Albin, Maurice S.: *See*—
Bunegin, Leonid; and Albin, Maurice S., 4,995,401, Cl. 128-748.000.

Alcan International Limited: *See*—
Tuck, Clive D. S., 4,996,129, Cl. 429-194.000.

Alcon Laboratories, Inc.: *See*—
Aoki, K. Roger, 4,996,209, Cl. 514-263.000.

Aldecoa, Julio A.; and Miller, Lawrence F., to Nova Manufacturing, Inc. Rechargeable battery. 4,996,128, Cl. 429-153.000.

Alexander, James L. Package adapter. 4,995,569, Cl. 242-130.000.

Alexius, Richard C., to Martin Marietta Corporation. Motion amplifier employing a dual piston arrangement. 4,995,587, Cl. 251-129.060.

Alfit Gesellschaft m.b.H.: *See*—
Albiez, Alfred, 4,995,683, Cl. 312-348.400.

Alkinson, Victor G.: *See*—
Bevan, Leonard N.; Moore, Colin R.; and Alkinson, Victor G., 4,996,184, Cl. 503-226.000.

Allen-Bradley Company, Inc.: *See*—
DeLange, Robert J.; and Merrison, John C., 4,996,469, Cl. 318-757.000.
Eshghy, Siavash, 4,995,145, Cl. 29-407.000.
Rowan, Timothy M.; and Merrison, John C., 4,996,470, Cl. 318-772.000.

Allied Colloids Ltd.: *See*—
Farrar, David; Flesher, Peter; and Lawrence, Peter R. B., 4,996,251, Cl. 524-17.000.

Allied-Signal Inc.: *See*—
Chai, Bruce H. T., 4,996,187, Cl. 505-1.000.
Crumb, Donald A.; Zander, Richard A.; and Gaiser, Robert F., 4,995,676, Cl. 303-9.630.
Fisher, William B.; Crescentini, Lamberto; and Balint, Laszlo J., 4,996,036, Cl. 423-388.000.
Mani, Krishnamurthy N., 4,995,956, Cl. 204-182.400.
Temple, Robert B.; and Colpaert, James J., 4,995,481, Cl. 188-70.00R.
Tervo, John N., 4,995,414, Cl. 137-1.000.

Allor, Richard L.; Herman, John A., Sr.; and DeBell, George C., to Ford Motor Company. Lightweight rocker arm. 4,995,281, Cl. 74-559.000.

Allwood, Searle & Timney (Holdings) Limited: *See*—
Searle, John G., 4,995,544, Cl. 228-2.000.

Alps Electric Co., Ltd.: *See*—
Iwanaga, Atsushi, 4,996,615, Cl. 360-104.000.
Saito, Mitsuru; Matsumora, Satoru; and Watanabe, Yasushi, 4,996,005, Cl. 252-512.000.

Alumax Inc.: *See*—
Waggoner, Richard L., 4,995,308, Cl. 98-37.000.

Aluminum Company of America: *See*—
Hector, Louis G.; and Sheu, Shen S., 4,996,113, Cl. 428-600.000.

ALZA Corporation: *See*—
Eckenhoff, James B.; Magruder, Judy A.; Cortese, Richard; Peery, John R.; and Wright, Jeremy C., 4,996,060, Cl. 424-473.000.

Alznauer, Kurt; Baumgartner, Michael; Boegli, Werner; and Brauer, Jurgen, to Elpatronic AG. Method and apparatus for ensuring the dimensional accuracy of a frusto-pyramidal can body. 4,995,254, Cl. 72-342.100.

Amano, Masaki: *See*—
Oda, Junichi; Amano, Masaki; Toda, Haruhiko; and Koyagi, Toshiyuki, 4,996,158, Cl. 435-280.000.

American Cyanamid Company: *See*—
Bitha, Panayota; Hlavka, Joseph J.; and Lin, Yang-I, 4,996,337, Cl. 556-137.000.
Cevasco, Albert A., 4,996,350, Cl. 560-192.000.
Futcher, Ian, 4,995,900, Cl. 71-92.000.
Lutz, Albert W.; and Rodaway, Shirley J., 4,995,903, Cl. 71-121.000.
McGahren, William J.; and Ellestad, George A., 4,996,305, Cl. 536-17.500.
Sutherland, Derek R.; Ramsay, Michael V. J.; Ward, John B.; Porter, Neil; Noble, Hazel M.; Fletton, Richard A.; and Noble, David, 4,996,228, Cl. 514-450.000.
Woodruff, Keith F., 4,995,555, Cl. 239-43.000.

American Dynamics Corporation: *See*—
Waehner, Glenn C., 4,996,497, Cl. 330-151.000.

American Standard Inc.: *See*—
Carey, Michael D., 4,995,239, Cl. 62-149.000.

American Tech Manufacturing, Corp.: *See*—
Linker, Frank V., 4,996,439, Cl. 250-561.000.

Ameter, Stephen L. Apparatus for windshield repair. 4,995,798, Cl. 425-012.000.

Amoco Corporation: *See*—
Ernst, Andreas B.; and Caspari, Gunter, 4,996,367, Cl. 568-33.000.
Haddad, Muin S.; Meyers, Bernard L.; and Eryman, William S., 4,996,179, Cl. 502-209.000.
Joung, John J.; Akin, Cavit; and Royer, Garfield P., 4,996,150, Cl. 435-161.000.
Rai, Chandra S.; and Sondergeld, Carl H., 4,996,421, Cl. 250-255.000.

AMP Incorporated: *See*—
Ayer, Kenneth N.; and Scholz, James P., 4,995,838, Cl. 439-874.000.
Bakermans, Johannes C. W., 4,995,289, Cl. 83-690.000.
Casagrande, Mario, 4,995,831, Cl. 439-557.000.
Casey, Daniel T., 4,995,821, Cl. 439-157.000.
Couper, William D.; and Michael, George W., 4,995,837, Cl. 439-863.000.
Grabbe, Dimitry G., 4,995,816, Cl. 439-71.000.
Grabbe, Dimitry G., 4,995,817, Cl. 439-71.000.
Hasegawa, Izumi, 4,995,834, Cl. 439-620.000.
Korsunsky, Iosif; Schroepfer, Richard C.; and Leidy, James A., 4,995,825, Cl. 439-328.000.
Ohl, William C., 4,995,819, Cl. 439-79.000.
Schieferly, Stephen B., 4,995,826, Cl. 439-347.000.
Weidler, Charles H., 4,995,814, Cl. 439-61.000.

Ampex Corporation: *See*—
Orton, Gregory A., 4,996,620, Cl. 360-121.000.

Amplatz, Kurt; and Kotula, Frank, to Microvena Corporation. Combined needle and dilator apparatus. 4,995,866, Cl. 604-53.000.

Ams, Felix; Baier, Manfred; and Schafer, Roland, to Richard Wolf GmbH. Device with a rotationally-driven surgical instrument. 4,995,877, Cl. 606-180.000.

Amzajerdian, Farzin, to Litton Systems, Inc. Pulsed coherent Doppler laser radar. 4,995,720, Cl. 356-5.000.

Anafi, David; Mitchell, John H.; and Schall, Harold B., to United Technologies Corporation. Optical system for wavefront compensation. 4,996,412, Cl. 250-201.900.

Anderson, Bruce E.: *See*—
Markson, Ralph J.; and Anderson, Bruce E., 4,996,473, Cl. 324-72.000.

Anderson, Patrick L.; Sarr, Dennis P.; and Simpson, Mark B., to Boeing Company, The. Probe for inspecting countersunk holes in conductive bodies. 4,996,492, Cl. 324-687.000.

Anderson, Peter N. Acoustic instrument with internally positioned microphone means for receiving acoustical vibrations. 4,995,293, Cl. 84-733.000.

Anderson, Richard L.: *See*—
Gerhold, Bruce W.; and Anderson, Richard L., 4,996,387, Cl. 585-654.000.

Anderson, Robert L.; and Helmer, John C., to Varian Associates, Inc. Sputtering apparatus with a rotating magnet array having a geometry for specified target erosion profile. 4,995,958, Cl. 204-298.200.

Anderson, Robert W.: *See*—
Hauser, Oscar G.; Anderson, Robert W.; and Hart, Lawrence M., 4,996,425, Cl. 250-325.000.

Anderson, William D., to RCA Licensing Corporation. Television tuner oscillator with three point tracking. 4,996,599, Cl. 358-191.100.

Andersson, Roland. Corrective posture device. 4,995,383, Cl. 128-157.000.

Ando, Eiichi: *See*—
Ohashi, Masashi; Toyama, Yoshikuni; Kagiura, Kazuo; Maruyama, Hiroyoshi; Shiratori, Tatsuya; Shirai, Masanari; and Ando, Eiichi, 4,995,601, Cl. 271-127.000.

Ando, Hiroyuki: *See*—
Okamoto, Yoshio; Nakamura, Yozo; Uchiyama, Kyoichi; Watanabe, Haruo; Kosuge, Tokuo; Onishi, Akira; Terasaki, Akashi; Ando, Hiroyuki; and Hamashima, Eiji, 4,995,559, Cl. 239-493.000.

Andrepont, John S.: *See*—
Kooy, Richard J.; Andrepont, John S.; Gyger, Roger F.; and Tyree, Lewis, Jr., 4,995,234, Cl. 60-648.000.

Anno, Masahiro; and Sano, Eiichi, to Minolta Camera Kabushiki Kaisha. Developer having specific spheriodicity. 4,996,126, Cl. 430-106.600.

Anritsu Corporation: *See*—
Sonobe, Yoji; and Tanimoto, Takao, 4,995,724, Cl. 356-319.000.

Ansell, Graham: *See*—
Diwell, Alan F.; Hallett, Christopher; Ansell, Graham; and Hayes, John W., 4,996,180, Cl. 502-304.000.

Anton, Mark A.; Steinman, Jory A.; Suek, Paul A.; and Johnson, Wayne A., to ADC Telecommunications, Inc. Optical fiber distribution frame. 4,995,688, Cl. 350-96.100.

Aoki, K. Roger, to Alcon Laboratories, Inc. Ophthalmic antiinflammatory compositions comprising S(+)-flurbiprofen. 4,996,209, Cl. 514-263.000.

Aoki, Keiji: *See*—
Kamei, Eiichi; Namba, Hideaki; Ohba, Masahiro; Tanaka, Shinichiro; and Aoki, Keiji, 4,995,364, Cl. 123-442.000.

Aonuma, Mitsuyoshi; Suzuki, Tatsunosuke; Isomura, Satoru; and Nishimura, Koichi, to Nippon Zeon Co., Ltd. Thermoplastic and elastomeric composition. 4,996,264, Cl. 525-179.000.

Aoshima, Shinichiro: *See*—
Takahashi, Hironori; Aoshima, Shinichiro; and Tsuchiya, Yutaka, 4,996,475, Cl. 324-96.000.

Aoyagi, Akihiko; Endo, Tatsuya; and Terashima, Hiroshi, to International Business Machines Corporation. Head suspension load beam with reinforcing ribs. 4,996,616, Cl. 360-104.000.

Appl, Herbert; Gnann, Michael; Jahr, Wolfgang; and Rossberger, Erwin, to Peroxid-Chemie GmbH. Valve metal/platinum composite electrode. 4,995,550, Cl. 228-175.000.

Appleton Papers Inc.: *See*—
Mathiaparanam, Ponnampalam, 4,996,328, Cl. 548-427.000.

Applications Mecaniques et Robinetterie: *See*—
Garrigues, Jean-Claude; Laulhe, Rene; and Rieuvernet, Pierre, 4,995,305, Cl. 92-138.000.

Apricot S.A.: *See*—
Lo, Shui-Yin, 4,995,699, Cl. 350-96.320.

Arai, Toshiyuki; Gupte, Pradeep M.; and Lasker, Sigmund E. Method for introducing oxygen-17 into tissue for imaging in a magnetic resonance imaging system. 4,996,041, Cl. 424-9.000.

Arai, Yoneaki: *See*—
Kashio, Yukio; and Arai, Yoneaki, 4,995,294, Cl. 84-738.000.

Arakawa, Motoomi: *See*—
Tada, Akihiro; Kiriu, Takashi; and Arakawa, Motoomi, 4,996,339, Cl. 556-181.000.

Araki, Shigeo: *See*—
Suzuki, Hiroyuki; and Araki, Shigeo, 4,996,671, Cl. 365-203.000.

Arbaugh, Robert P.: *See*—
Ertle, Raymond T.; and Arbaugh, Robert P., 4,996,001, Cl. 252-99.000.

Arco Chemical Technology, Inc.: *See*—
Kesling, Haven S., Jr.; Shawl, Edward T.; and Zajacek, John G., 4,996,359, Cl. 564-50.000.
Lin, Shaw-Chan; and Cochran, Robert N., 4,996,374, Cl. 568-814.000.

Arikawa, Takamasa: *See*—
Takahashi, Yoshio; Sudo, Mitsuo; Arikawa, Takamasa; Nakamura, Kenji; Sato, Izumi; Onogi, Katsuyuki; Iura, Takao; and Ishida, Nobuji, 4,995,505, Cl. 198-468.400.

Arimori, Iwao, to Mitsubishi Denki Kabushiki Kaisha. Variable-delay signal generating apparatus for driving solid-state image pick-up device. 4,996,601, Cl. 358-213.310.

Arisaka, Tomokichi; and Yamaguchi, Mitsuyoshi, to Kabushiki Kaisha ALPS Tool. Apparatus for rotatably supporting and feeding elongated rod member. 4,995,298, Cl. 82-127.000.

Aristech Chemical Corporation: *See*—
Auger, Robert G., 4,995,946, Cl. 203-99.000.
Cullo, Leonard A.; and Shiring, Francis J., III, 4,996,385, Cl. 585-640.000.

Arizona Board of Regents: *See*—
Pettit, George R.; and Singh, Sheo B., 4,996,237, Cl. 514-720.000.

Armstrong, Mark L.; and Mickish, Daniel J., to Du Pont de Nemours, E. I., and Company. Method and system for making a reflection hologram. 4,995,685, Cl. 350-3.650.

Armstrong World Industries, Inc.: *See*—
Krug, James B.; Lenox, Ronald S.; and Stewart, William J., 4,995,910, Cl. 106-287.320.

Arnold, Benjamin L., III. Unitized sodium bicarbonate deodorizer. 4,995,556, Cl. 239-57.000.

Arnold, Gerhard: *See*—
Kanne, Friedrich; Pfleger, Klaus; Glomb, Hans; Arnold, Gerhard; Boettcher, Klaus; and Kursawe, Siegfried, 4,996,026, Cl. 422-106.000.

Arnold, John R. Left ventricular assist device and method for temporary and permanent procedures. 4,995,857, Cl. 600-16.000.

Arnulf, Paul: *See*—
Girault, Eric; and Arnulf, Paul, 4,995,632, Cl. 280-615.000.

Arocha, Henry F. Interaxle transfer mechanism for four wheel drive vehicles. 4,995,862, Cl. 475-86.000.

Arora, Sudershan K.: *See*—
Ronsen, Bruce; Arora, Sudershan K.; and Thomas, Albert V., 4,996,195, Cl. 514-23.000.

Arpin, Rene, to Rhone-Poulenc Chimie. Imide/epoxy thermosetting compositions. 4,996,285, Cl. 528-117.000.

Arthur Guinness Son & Company (Dublin) Limited: *See*—
Byrne, William J., 4,995,218, Cl. 53-410.000.

Aruga, Shuji, to Seiko Epson Corporation. Projection-type display device. 4,995,702, Cl. 350-331.00R.

Aruga, Tomotsu: *See*—
Sasaki, Masaomi; and Aruga, Tomotsu, 4,996,362, Cl. 564-315.000.

Arvikar, Ram J.; Benko, John W.; Coucoulas, Alexander; and Wojcik, Thaddeus, to AT&T Bell Laboratories. Method for hermetically sealing electronic devices. 4,995,149, Cl. 29-25.350.

Asagiri, Katuki: *See*—
Shinto, Hiroaki; Sakaguchi, Sumio; and Asagiri, Katuki, 4,995,638, Cl. 280-731.000.

Asahi Glass Company Ltd.: *See*—
Oyama, Takuji; Suzuki, Koichi; and Mizuhashi, Mamoru, 4,996,105, Cl. 428-336.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Enomoto, Shigeo; and Odano, Taminori, 4,996,545, Cl. 354-70.000.

Asakawa, Minoru: *See*—
Soma, Utami; Koseki, Yasufumi; and Asakawa, Minoru, 4,996,625, Cl. 361-87.000.

Asakura, Kenji: *See*—
Sasaki, Hirotaka; Tanaka, Aguri; Inagaki, Hiroyuki; Suzuki, Tatsuo; and Asakura, Kenji, 4,995,871, Cl. 604-110.000.

Asbeck, Peter M.: *See*—
Chang, Mau-Chung F.; and Asbeck, Peter M., 4,996,165, Cl. 437-31.000.

Asbery, Ray, to Equalizer Tools, Inc. Glass cut-out wire gripper apparatus and method. 4,995,153, Cl. 30-116.000.

Asea Brown Boveri Ltd.: *See*—
Jongenburger, Peter, 4,995,922, Cl. 148-428.000.
Posedel, Zlatimir, 4,996,486, Cl. 324-545.000.

Asghar, Safdar M.; and Bartkowiak, John G., to Advanced Micro Devices, Inc. Apparatus having shared modular architecture for decimation and interpolation. 4,996,528, Cl. 341-110.000.

Ash Medical System, Incorporated: *See*—
Ash, Stephen R.; and Echard, Terrance G., 4,995,268, Cl. 73-861.050.

Ash, Stephen R.; and Echard, Terrance G., to Ash Medical System, Incorporated. Method and apparatus for determining a rate of flow of blood for an extracorporeal blood therapy instrument. 4,995,268, Cl. 73-861.050.

Assaf, Gad, to Ormat Turbines, Ltd. Method of and means for controlling the condition of air in an enclosure. 4,995,242, Cl. 62-271.000.

Assist, Inc.: *See*—
Kringen, Dale E.; and Culhane, Thomas D., 4,996,517, Cl. 340-506.000.

Associated Mills, Inc.: *See*—
Gentry, Jefferson L.; Rundzaitis, Alfons; and Hilger, Ronald O., 4,995,155, Cl. 30-41.000.

Astill, Mark E.: *See*—
Smith, Roger E.; Astill, Mark E.; Smith, Jay L.; and Thorne, Gale H., 4,995,402, Cl. 128-771.000.

Aston, David A.; and Paul, Stewart N., to Dearborn Chemical Company Ltd. Controlling deposits on paper machine felts using cationic polymer and cationic surfactant mixture. 4,995,944, Cl. 162-199.000.

Astra Meditec Aktiebolag: *See*—
Soderberg, Per Olof, 4,995,810, Cl. 433-141.000.

Asyst Technologies, Inc.: *See*—
Bonora, Anthony C.; and Rosenquist, Frederick T., 4,995,430, Cl. 141-98.000.

Aszodi, Gabor: *See*—
Ferenczi, Gyorgy; Erdelyi, Katalin; Somogyi, Maria; Boda, Janos; Fule, Gyorgy; and Aszodi, Gabor, 4,995,939, Cl. 156-627.000.

AT&T Bell Laboratories: *See*—
Arvikar, Ram J.; Benko, John W.; Coucoulas, Alexander; and Wojcik, Thaddeus, 4,995,149, Cl. 29-25.350.
Blonder, Greg E.; Blyler, Lee L., Jr.; and Grimes, Gary J., 4,995,686, Cl. 350-96.150.
Brunson, Gordon R., 4,996,704, Cl. 379-67.000.
Buchanan, W. A.; and Heiter, G. L., 4,995,815, Cl. 439-63.000.
Chen, Min-Liang, 4,996,167, Cl. 437-40.000.
Entenmann, John K.; Hooke, John A.; Kampmeier, Eric E.; and Posterick, Barry L., 4,996,705, Cl. 379-91.000.
Houlihan, Francis M.; Reichmanis, Elsa; and Thompson, Larry F., 4,996,136, Cl. 430-313.000.
Kourtakis, Kostantinos; and Robbins, Murray, 4,996,189, Cl. 505-1.000.
Lynch, William T.; and Manchanda, Lalita, 4,996,576, Cl. 357-29.000.
Pimpinella, Richard J.; Segelken, John M.; Tai, King L.; and Thompson, Ross J., 4,995,695, Cl. 350-96.200.

Atlantic Richfield Company: *See*—
Cornette, Holley M.; and Weingarten, Jean M. S., 4,995,456, Cl. 166-51.000.
Cowley, Trent E., 4,995,355, Cl. 123-198.0DB.
Kramm, Robert C.; and Lane, Robert H., 4,995,463, Cl. 166-308.000.
Patteson, R. Mark; and Lynch, Samuel C., 4,995,763, Cl. 405-195.000.
Scott, Bentley N.; and Yang, Y. Sam, 4,996,490, Cl. 324-639.000.
Spies, Brian R., 4,996,484, Cl. 324-334.000.
Torres, Daniel L.; Gullikson, Darryl C.; Case, M. Bruce; and Neher, Ralph A., 4,995,413, Cl. 137-1.000.
Zupanick, Joseph E., 4,995,198, Cl. 51-319.000.

Atochem: *See*—
Commandeur, Raymond; and Ghenassia, Elie, 4,996,360, Cl. 564-90.000.
Pralus, Christian; and Schirmann, Jean-Pierre, 4,996,039, Cl. 423-584.000.

Atochem North America, Inc.: *See*—
Wright, Danny W.; and Wagner, Barry L., 4,996,378, Cl. 570-164.000.

Auger, Robert G., to Aristech Chemical Corporation. Method and apparatus for achieving balanced flow on multipass distillation trays. 4,995,946, Cl. 203-99.000.

Augis, Daniel: *See*—
Kossiakoff, Nicolas; and Augis, Daniel, 4,995,407, Cl. 131-359.000.
Aurness, Harold O.; and Mahler, Thomas G. Animal feces retriever. 4,995,661, Cl. 294-1.400.
Ausimont S.r.l.: *See*—
Marraccini, Antonio; Pasquale, Antonio; and Fiorani, Tiziana, 4,996,370, Cl. 568-674.000.
Austria Metall Aktiengesellschaft: *See*—
Garneweidner, Peter, 4,995,486, Cl. 188-374.000.
Automotive Technologies International, Inc.: *See*—
Breed, David S., 4,995,639, Cl. 280-735.000.
Auvity, Michel; and Chesnier, Patrice, to Valeo. Control unit for a heating, ventilating and/or air conditioning installation for an automotive vehicle. 4,995,554, Cl. 236-51.000.
Avakian, Roger W., to General Electric Company. Enhancing color stability to sterilizing radiation of polymer compositions. 4,996,244, Cl. 523-136.000.
Avakian, Roger W.: *See*—
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, 4,996,245, Cl. 523-136.000.
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, 4,996,246, Cl. 523-136.000.
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, 4,996,247, Cl. 523-136.000.
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, 4,996,248, Cl. 523-136.000.
Avis, Graham M.: *See*—
Critchlow, David N.; Avis, Graham M.; Earlam, Sandra J. K.; Johnson, Karle J.; Smetana, Bruce A.; Westling, Gregory L.; Paneth, Eric; and Yehushua, Moshe, 4,996,697, Cl. 375-104.000.
Awad, Rami-Raimund; Dworak, Gert; Zuckert, Bertram; and Weger, Walter, to Vianova Kunstharz, A.G. Water-dilutable air-drying protective coating compositions. 4,996,250, Cl. 523-500.000.
Ayer, Kenneth N.; and Scholz, James P., to AMP Incorporated. Electrical terminal and method of making same. 4,995,838, Cl. 439-874.000.
Azerad, Robert G.: *See*—
Jarreau, Francois X.; Azerad, Robert G.; and Ogerau, Thierry P., 4,996,149, Cl. 435-119.000.
Azuchi, Kazunari: *See*—
Haneda, Shinichi; Terada, Haruhiko; Azuchi, Kazunari; and Gyobu, Kiyohito, 4,996,634, Cl. 362-82.000.
B. Braun Melsungen AG: *See*—
Knoch, Martin; Reul, Helmut; and Rau, Gunter, 4,995,881, Cl. 623-2.000.
B. F. Goodrich Company, The: *See*—
Hsu, Chin C., 4,996,274, Cl. 526-208.000.
B. V. Optische Industrie "De Oude Delft": *See*—
Geluk, Ronald J., 4,996,701, Cl. 378-146.000.
Babcock, Bryce W.; Kiblawi, Daniel F.; and Wolbers, Eugene A., to Federal-Mogul Corporation. Reusable position retaining strap for clutch release mechanism. 4,995,492, Cl. 192-85.0CA.
Babcock-BSH Aktiengesellschaft, vormals Buttner-Schilde-Haas AG: *See*—
Eberhardt, Kurt; and Nibrig, Reinhold, 4,995,729, Cl. 366-2.000.
Bacon, D. Dexter: *See*—
Connery, Daniel P.; Bacon, D. Dexter; and Blair, Stacy K., 4,995,764, Cl. 405-229.000.
Bagrodia, Shriram: *See*—
Raynolds, Peter W.; and Bagrodia, Shriram, 4,996,107, Cl. 428-400.000.
Bahn, Peter R.: *See*—
Fox, Sidney W.; and Bahn, Peter R., 4,996,292, Cl. 528-328.000.
Baier, Manfred: *See*—
Ams, Felix; Baier, Manfred; and Schafer, Roland, 4,995,877, Cl. 606-180.000.
Baika, Toyokazu: *See*—
Tate, Takao; Nakamura, Norihiko; Noguchi, Hiroshi; Kawagoe, Michio; Baika, Toyokazu; Kato, Kichiro; Kido, Yoshio; Hirose, Katsuhiko; Nihei, Hiroaki; and Masubuchi, Masahiko, 4,995,347, Cl. 123-65.0BA.
Bailey, J. Milton: *See*—
Hawsey, Robert A.; and Bailey, J. Milton, 4,996,457, Cl. 310-268.000.
Bailey, William R.: *See*—
Geib, Lawrence E.; Bailey, William R.; and Zielinski, James S., 4,995,829, Cl. 439-409.000.
Baird, John, to Motorola, Inc. Molding process for encapsulating semiconductor devices using a thixotropic compound. 4,996,170, Cl. 437-219.000.
Baker, Raymond; Leeson, Paul D.; and Britcher, Susan F., to Merck Sharp & Dohme Ltd. Substituted dibenzocycloheptenimines. 4,996,211, Cl. 514-289.000.
Baker, Russ J., to Emhart Industries, Inc. Self-calibrating glass container inspection machine. 4,996,658, Cl. 364-571.040.
Bakermans, Johannes C. W., to AMP Incorporated. Die assembly having improved insert retaining system and having reversible die inserts. 4,995,289, Cl. 83-690.000.
Baldridge, Morris G., to Halliburton Company. Lift-through head and swivel. 4,995,457, Cl. 166-70.000.
Baldwin, Jack E., to National Research Development Corporation. Penicillins. 4,996,313, Cl. 540-312.000.
Baldwin, John J.; and Remy, David C., to Merck & Co., Inc. Dibenzo[a,d]cycloheptenylidene compounds. 4,996,321, Cl. 546-194.000.
Baldwin, Kenneth B.: *See*—
Balyasny, Marik; and Baldwin, Kenneth B., 4,996,476, Cl. 324-158.00F.
Balint, Laszlo J.: *See*—
Fisher, William B.; Crescentini, Lamberto; and Balint, Laszlo J., 4,996,036, Cl. 423-388.000.
Ballenger, William; Sherman, Wayne; and Suter, Michael, to FMC Corporation. Modular longitudinal spray finisher. 4,995,973, Cl. 210-209.000.
Ballet, Jean-Noel, to Ecia-Equipements et Composants pour l'Industrie Automobile. Spring-loaded barrel, in particular for a seat belt retractor. 4,995,567, Cl. 242-107.000.
Balyasny, Marik; and Baldwin, Kenneth B., to ITT Corporation. Test clip for surface mount device. 4,996,476, Cl. 324-158.00F.
Balzers Aktiengesellschaft: *See*—
Stocker, Rudolf, 4,995,263, Cl. 73-702.000.
Stocker, Rudolf; and Schaedler, Walter, 4,995,264, Cl. 73-702.000.
Stocker, Rudolf, 4,995,265, Cl. 73-702.000.
Bamber, David J., to Coleman Outdoor Products, Inc. Nesting flatware set. 4,995,154, Cl. 30-147.000.
Ban, Tomohiro: *See*—
Hirata, Keiichi; Kawakami, Yasushi; Miura, Tomoko; Mukai, Miyako; Ban, Tomohiro; and Furukawa, Akihiro, 4,995,739, Cl. 400-63.000.
Bando Chemical Industries, Inc.: *See*—
Hasebe, Kanteru; Matsuoka, Hiroshi; and Yanagi, Kyotaro, 4,995,855, Cl. 474-167.000.
Bankel, Adolf; Strauss, Hans; and Kerk, Stephan, to Diehl GmbH & Co. Safe-and-arm device for the fuze of a spin-stabilized projectile. 4,995,317, Cl. 102-235.000.
Barbetti, Jamie L.: *See*—
Zalenski, Thomas C.; and Barbetti, Jamie L., 4,996,393, Cl. 178-19.000.
Bard Limited: *See*—
Brazier, Gary B., 4,995,868, Cl. 604-105.000.
Barfoot, James W.: *See*—
Beckman, Ralph A.; Sharpe, Henry D., III; Curado, Len; and Barfoot, James W., 4,995,403, Cl. 128-776.000.
Barkatt, Aaron, to Pedro B. Macedo; and Theodore Aaron Litovitz. Supported heteropolycyclic compounds in the separation and removal of late transition metals. 4,995,984, Cl. 210-670.000.
Barker, Douglas J. Compact bidet assembly with external adjustment. 4,995,121, Cl. 4-443.000.
Barlow, David E.: *See*—
Inaba, Makoto; Hayashi, Masaaki; Hashiguchi, Toshihiko; Hibino, Hiroki; Sasa, Hiroyuki; Barlow, David E.; Ohshima, Yutaka; Ishihara, Kohichiro; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Klosterman, Frank; and Goodman, Jack, 4,995,396, Cl. 128-654.000.
Barner, Richard; and Hubscher, Josef, to Hoffmann-La Roche Inc. Vitamin E intermediates and a process for their manufacture and conversion into Vitamin E. 4,996,375, Cl. 568-853.000.
Barney, RIchard D.; and Magner, Thomas J., to United States of America, National Aeronautics and Space Administration. Cryogenic shutter. 4,995,700, Cl. 350-266.000.
Barr, Fraser M. Bottom dumping bulk container apparatus. 4,995,522, Cl. 220-1.500.
Barr, John D.; and Newton, Thomas A., Jr., to Reed Tool Company Limited. Cutting elements for rotary drill bits. 4,995,887, Cl. 51-295.000.
Barthel, Richard C.; Malone, Peter J.; Orth, Charles D.; and Jarosch, George W., to Eaton Corporation. Controlling refrigeration having control module directly attached on valve body. 4,995,240, Cl. 62-225.000.
Bartholomew, Victor L.; and di Palma, Giorgio, to Imed Corporation. Dual chamber pumping apparatus. 4,995,864, Cl. 604-153.000.
Barthorpe, Richard T., to Marathon Oil Company. Process for recovering and purifying a high molecular weight sulfonate. 4,995,982, Cl. 210-634.000.
Bartkowiak, John G.: *See*—
Asghar, Safdar M.; and Bartkowiak, John G., 4,996,528, Cl. 341-110.000.
Bartlett, Matthew T., to Signet Systems, Inc. Multiple tube diameter heat exchanger circuit. 4,995,453, Cl. 165-150.000.
Bartley, Leonard S., Jr.: *See*—
Papke, Brian L.; and Bartley, Leonard S., Jr., 4,995,993, Cl. 252-25.000.
Barton, Kenneth S. Method and apparatus for repairing ruptures in underground conduits. 4,995,761, Cl. 405-154.000.
Baseggio, Marcello: *See*—
Moulin, Michel; and Baseggio, Marcello, 4,996,543, Cl. 354-5.000.
BASF Aktiengesellschaft: *See*—
Berbner, Heinz; Ebel, Klaus; Kuczaty, Michael; Seid, Bernhard; Woerner, Frank P.; and Zettler, Hans D., 4,996,289, Cl. 528-230.000.
Bott, Kaspar; Hoffmann, Herwig; Scheidmeir, Walter; and Trapp, Horst, 4,996,324, Cl. 546-339.000.
Czauderna, Bernhard; Nieberle, Juergen; Peter, Roland; and Nissen, Dietmar, 4,996,270, Cl. 525-531.000.
Gerth, Dale; Ittemann, Peter; and Tesch, Helmut, 4,996,267, Cl. 525-423.000.
Kochanek, Wolfgang; and Leutner, Bernd, 4,995,950, Cl. 204-91.000.
Koehler, Gernot; Schmidt-Thuemmes, Juergen; Hasenbein, Norbert; Schlemmer, Lothar; and Dietsche, Wolfram, 4,996,259, Cl. 524-276.000.

Lauterbach, Gerald; Pape, Frank F.; and Gramlich, Walter, 4,996,365, Cl. 568-427.000.

Leyendecker, Joachim; Neubauer, Hans-Juergen; Kardorff, Uwe; Kuenast, Christoph; Hofmeister, Peter; and Krieg, Wolfgang, 4,996,216, Cl. 514-338.000.

Merkle, Hans R.; and Fretschner, Erich, 4,996,327, Cl. 548-373.000.

Neumann, Peter; and Eichenauer, Ulrich, 4,996,354, Cl. 562-424.000.

Scholz, Herbert; Zeidler, Adolf; Wuerzer, Bruno; and Meyer, Norbert, 4,995,899, Cl. 71-92.000.

Wild, Jochen; Harreus, Albrecht; and Goetz, Norbert, 4,996,377, Cl. 570-141.000.

Baskas, Morris J. Disposable syringe with retractable needle. 4,995,870, Cl. 604-110.000.

Bastow, David R.: *See—*
Francis, David J.; and Bastow, David R., 4,996,092, Cl. 428-157.000.

Bates, Kenneth W.: *See—*
Thrower, Anthony; and Bates, Kenneth W., 4,995,270, Cl. 73-863.850.

Battelle Memorial Institute: *See—*
Jolly, Mark; Negaty-Hindi, Guy; and Haour, Georges, 4,995,444, Cl. 164-97.000.

Bauer, Helmut: *See—*
Muller, Dietmar; Bauer, Helmut; Franken, Harald; and Seiter, Harry, 4,995,802, Cl. 425-154.000.

Bauer, Richard G.: *See—*
Pyke, James B.; Bauer, Richard G.; and Burlett, Donald J., 4,996,262, Cl. 525-177.000.

Pyke, James B.; Bauer, Richard G.; Cohen, Martin P.; and Handa, Pawan K., 4,996,263, Cl. 525-178.000.

Baumgartner, Michael: *See—*
Alznauer, Kurt; Baumgartner, Michael; Boegli, Werner; and Brauer, Jurgen, 4,995,254, Cl. 72-342.100.

Bausch & Lomb Professional Dental Products, Inc.: *See—*
Beckman, Ralph A.; Sharpe, Henry D., III; Curado, Len; and Barfoot, James W., 4,995,403, Cl. 128-776.000.

Bayer Aktiengesellschaft: *See—*
Bottenbruch, Ludwig; Ruppert, Heinrich; Isaacs, Neil S.; and Latham, Kenneth G., 4,996,373, Cl. 568-727.000.

Bucheler, Manfred; Gehringer, Hans; Klinksiek, Bernd; and Koglin, Bernd, 4,996,004, Cl. 252-314.000.

Heinz, Hans-Detlef; Kohler, Burkhard; Meyer, Rolf-Volker; Reinking, Klaus; and Sommer, Alexa, 4,996,256, Cl. 524-112.000.

Lindner, Werner; and Brandes, Wilhelm, 4,996,208, Cl. 514-258.000.

Bayerische Motoren Werke Aktiengesellschaft: *See—*
Dagustany, Amer; Spriestersbach, Jochen; Gunther, Bernd; and Knall, Gerhard, 4,995,917, Cl. 148-3.000.

BBC Aktiengesellschaft, Brown, Boveri & Cie: *See—*
Chu, Wing F.; and Rohr, Franz J., 4,996,117, Cl. 428-633.000.

Beacom, Thomas J.; and Freerksen, Donald L., to International Business Machines Corporation. Selection of divisor multipliers in a floating point divide circuit. 4,996,660, Cl. 364-748.000.

Beall, George H.; Dickinson, James E., Jr.; and Quinn, Candace J., to Corning Incorporated. Rare earth-containing zinc phosphate glasses. 4,996,172, Cl. 501-45.000.

Beason, Steven C.: *See—*
McKeown, Mark H.; and Beason, Steven C., 4,996,547, Cl. 354-81.000.

Beatty, William E., Jr.: *See—*
McKee, Jere L.; Thomas, Glenn R.; Gula, Lance; and Beatty, William E., Jr., 4,996,507, Cl. 335-195.000.

Beauchamp, Maryellen S.: *See—*
Beauchamp, Matthew R.; and Beauchamp, Maryellen S., 4,995,116, Cl. 2-104.000.

Beauchamp, Matthew R.; and Beauchamp, Maryellen S. Arms free privacy cape for breast feeding infants. 4,995,116, Cl. 2-104.000.

Beauducel, Claude, to Institut Francais du Petrole. Signal sensor insensitive to static pressure variations. 4,996,675, Cl. 367-162.000.

Beaupre, Richard F.; and Jung, Dick Y., to Texaco Inc. Separation of gas from solvent by membrane technology. 4,995,888, Cl. 55-16.000.

Becicka, Kenneth F.: *See—*
Yourgalite, Ray A.; Moore, Malcolm; Chamberlain, Neal C.; Becicka, Kenneth F.; Hilgeman, Samuel J.; and Moore, Kevin D., 4,995,224, Cl. 53-540.000.

Beck, Jeffrey L.; and Taylor, Larry D., to Conoco Inc. Rotary drillstring guidance by feedrate oscillation. 4,995,465, Cl. 175-27.000.

Becker, Earl M., Jr.; and Miller, Allen, to United States of America, Navy. R. F. lockout circuit for electronic locking system. 4,996,525, Cl. 340-825.310.

Becker, Paul; Powers, Carol; and Thompson, Mark S., to Raychem Corporation. Metal oxide varistors and methods therefor. 4,996,510, Cl. 338-21.000.

Beckman, Ralph A.; Sharpe, Henry D., III; Curado, Len; and Barfoot, James W., to Bausch & Lomb Professional Dental Products, Inc. Periodontal probe. 4,995,403, Cl. 128-776.000.

Beer, Stephen K.; and Pratt, Harold R., II, to United States of America, Energy. Spinning angle optical calibration apparatus. 4,996,483, Cl. 324-321.000.

Behdorf, Hans; Singe, Thomas; and Sollner, Gerhardt, to Vereinigte Aluminum Werke A.G. Composite material of aluminum and glass fiber mat, method for its production, and method for utilization as insulator for vehicles. 4,996,095, Cl. 428-215.000.

Behler, Ansgar; and Ploog, Uwe, to Henkel Kommanditgesellschaft auf Aktien. Use of alkaline earth salts of polycarboxylic acid monoesters as alkoxylation catalysts. 4,996,364, Cl. 564-475.000.

Beicht, Bernd; Heinemann, Joachim; Keller, Frank; and Tinz, Reinhard, to Carl Freudenberg, Firma. Fuel dispenser seal. 4,995,433, Cl. 141-312.000.

Beier, Rudolf: *See—*
Schwarzler, Peter; Wormsbacher, Hans; and Beier, Rudolf, 4,995,853, Cl. 464-144.000.

Beiersdorf Aktiengesellschaft: *See—*
Pietsch, Hanns; Kartheus, Holger; Holtzmann, Hans-Joachim; Sachau, Gunther; and Reul, Helmut, 4,996,054, Cl. 424-422.000.

Bell Communications Research, Inc.: *See—*
Farese, Thomas R.; and Ferrere, Kenneth E., 4,996,685, Cl. 370-58.100.

Nemes, Richard M., 4,996,663, Cl. 364-900.000.

Bell, Cynthia S.; and Gaboury, Michael J., to Eastman Kodak Company. Electroluminescent storage display with improved intensity driver circuits. 4,996,523, Cl. 340-781.000.

Bell, James A. E.: *See—*
Eerkes, Thijs; Diaz, Carlos M.; and Bell, James A. E., 4,996,115, Cl. 428-614.000.

Bell, Laurence D. Method for packaging perishables. 4,996,071, Cl. 426-415.000.

Bellamy, Francois: *See—*
Samreth, Soth; Bellamy, Francois; and Millet, Jean, 4,996,347, Cl. 558-411.000.

Beltzer, Morton: *See—*
Coyle, Catherine L.; Greaney, Mark A.; Stiefel, Edward I.; Francis, James N.; and Beltzer, Morton, 4,995,996, Cl. 252-42.700.

Benko, John W.: *See—*
Arvikar, Ram J.; Benko, John W.; Coucoulas, Alexander; and Wojcik, Thaddeus, 4,995,149, Cl. 29-25.350.

Bennett, Eldon R. Precast stair system. 4,995,205, Cl. 52-189.000.

Benson, Lewis B.: *See—*
Stowe, Donald H., Jr.; and Benson, Lewis B., 4,996,032, Cl. 423-242.000.

Bentley, Robert, to Hughes Aircraft Company. Closed loop bucking field system. 4,996,461, Cl. 315-8.000.

Berbner, Heinz; Ebel, Klaus; Kuczaty, Michael; Seid, Bernhard; Woerner, Frank P.; and Zettler, Hans D., to BASF Aktiengesellschaft. Continuous preparation of aqueous melamine/formaldehyde precondensate solutions. 4,996,289, Cl. 528-230.000.

Berchem, Rutger, to Metalpraecis Berchem & Schaberg Gesellschaft fur Metallformgebung mit beschraankter Haftung. Pipe section, especially for abrasive and/or corrosive material pipelines. 4,995,427, Cl. 138-155.000.

Berg, Lloyd, to Berg, Lloyd. Conversion of acetic acid into diketene and water using dimethylsulfoxide and pelargonic acid. 4,996,333, Cl. 549-328.000.

Berger, Joel G.; Chang, Wei K.; Gold, Elijah H.; and Elliott, Arthur J., to Schering Corporation. 1,2,4,5 tetrahydro benzazepine-3 compounds and antipsychotic use thereof. 4,996,202, Cl. 514-213.000.

Berger, Maurice; and Lauenstein, Michael, to Fabriques de Tabac Reunies, S.A. Rod conveyor and compartment therefor. 4,995,769, Cl. 414-403.000.

Bergmeier, Stephen C.; Kester, Jeffrey A.; Moos, Walter H.; Tecle, Haile; and Thomas, Anthony J., to Warner-Lambert Co. 4-(N-substituted amino)-2-butynyl-1-carbamates and thiocarbamates and derivatives thereof as centrally acting muscarinic agents. 4,996,201, Cl. 514-212.000.

Berkbuegler, Ronald L. Hunter's portable tree stand. 4,995,475, Cl. 182-187.000.

Berkebile, Donald C.; Lee, Donald M.; Veneziano, Larry D.; Lauer, Joseph J.; Booth, Roy E.; and Hettinger, William P. Processes for the manufacture of enriched pitches and carbon fibers. 4,996,037, Cl. 423-447.400.

Berkeley Speech Technologies, Inc.: *See—*
O'Malley, Sara; O'Malley, Michael H.; and Peters, Elisabeth, 4,996,707, Cl. 379-100.000.

Bernard, Louis A.; and Thomassin, Rene , to Aerospatiale Societe Nationale Industrielle. Device for increasing the stability of helicopters placed on board and set down, having a tricycle landing gear, and helicopter equipped with such a device. 4,995,574, Cl. 244-17.170.

Bernardis, Francesco; Marangon, Claudio; and Ferrarotti, Rinaldo, to Ing. C. Olivetti & C., S.p.A. Wire printer with step formation armature and method of assembly. 4,995,743, Cl. 400-124.000.

Bernhard, Konrad: *See—*
Zaehner, Hans; Bernhard, Konrad; and Weisser, Harald, 4,996,156, Cl. 435-252.500.

Bernstein, Elliot. Molded capless fuse. 4,996,509, Cl. 337-232.000.

Berquist, Lloyd G. Method and apparatus for reducing the velocity of particulate matter. 4,995,499, Cl. 193-32.000.

Bertin, Patrice; and Sevennec, Yvon, to Valeo. Control device for a coupling means such as a clutch. 4,995,488, Cl. 192-1.100.

Bessho, Yoshinori: *See—*
Fujita, Kazuhiko; and Bessho, Yoshinori, 4,995,726, Cl. 356-349.000.

Best Lock Corporation: *See—*
Preissler, Christopher M.; and Foshee, William R., deceased, 4,995,249, Cl. 70-224.000.

Betere Cabeza, Antonio, to Fabricas Lucia Antonio Betere, S.A. (Flabesa). Mattress assembly installation using positioning robot. 4,995,162, Cl. 29-564.200.

Betz Laboratories, Inc.: *See—*
Mohn, Michael F., 4,995,986, Cl. 210-717.000.

Whitekettle, Wilson K.; and Conlan, John T., 4,995,987, Cl. 210-754.000.

Bevan, Leonard N.; Moore, Colin R.; and Alkinson, Victor G., to Carrs Paper Limited. Sheet material for use in method for non-impact printing, photocopying and like reprographic processes. 4,996,184, Cl. 503-226.000.

Beyer-Olsen, Knut. Buoy with reduced drag. 4,995,842, Cl. 441-22.000.

Bezubic, William P., to Season-All Industries, Inc. Fiberglass reinforced plastic window sash frame and associated method. 4,995,213, Cl. 52-656.000.

Bhagwat, Dileep; Iny, Oliver; and Pedi, Frank, Jr., to Euroceltique, S.A. Stabilizing packaged iodophor and minimizing leaching of iodine through packaging. 4,996,048, Cl. 424-80.000.

Bhatt, Pankaj N.; and Blaushild, Ronald M., to Westinghouse Electric Corp. High pressure thimble/guide tube seal fitting with built-in low pressure seal especially suitable for facilitated and more efficient nuclear reactor refueling service. 4,996,018, Cl. 376-203.000.

Bibeau, Jean-Marie: *See*—
Lamoureux, Guy; and Bibeau, Jean-Marie, 4,995,773, Cl. 414-489.000.

Biftu, Tesfaye; Bugianesi, Robert L.; Girotra, Nirindar N.; Ponpipom, Mitree M.; Sahoo, Soumya P.; and Kuo, Chan H., to Merck & Co., Inc. 2,5-diaryl tetrahydrofurans and analogs thereof as PAF antagonists. 4,996,203, Cl. 514-231.500.

Bigdash, Vladimir D.: *See*—
Paton, Boris E.; Vasiliev, Vsevolod V.; Bogdanovsky, Valentin A.; Shelekhov, Konstantin V.; Gavva, Viktor M.; Bigdash, Vladimir D.; Tabunschik, Ivan A.; and Ilchishin, Andrei P., 4,996,409, Cl. 219-130.010.

Biggio, Richard R. Self loading and unloading pre-cast concrete hauling unit. 4,995,772, Cl. 414-458.000.

Binder, Rolf; and Hanselmann, Daniel, to Rieter Machine Works, Ltd. Apparatus for removing fiber flocks from a line of fiber bales. 4,995,142, Cl. 19-80.00R.

Birchall, James D.; Mockford, Mary J.; and Stanley, David R., to Imperial Chemical Industries Plc. Production of ceramic materials. 4,996,174, Cl. 501-87.000.

Bird, Kimon T., to Harbor Branch Oceanographic Institution, Inc. Algal strain for agar production. 4,996,389, Cl. 800-200.000.

Birx, Daniel L., to Science Research Laboratory, Inc. Method and apparatus for generating pulsed RF power. 4,996,495, Cl. 328-65.000.

Bitha, Panayota; Hlavka, Joseph J.; and Lin, Yang-I, to American Cyanamid Company. Synthesis of cisplatin analogs. 4,996,337, Cl. 556-137.000.

Bittencourt, Helio T., to S. Eletro-Acustica S.A. Electroacoustic piezoelectric transducer having a broad operating range. 4,996,713, Cl. 381-190.000.

Black, Kirby S.: *See*—
Hewitt, Charles W.; and Black, Kirby S., 4,996,193, Cl. 514-11.000.

Black, William L. Throw and fetch doggie toy. 4,995,374, Cl. 124-54.000.

Blair, Stacy K.: *See*—
Connery, Daniel P.; Bacon, D. Dexter; and Blair, Stacy K., 4,995,764, Cl. 405-229.000.

Blanco, Guillermo L.: *See*—
Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; and Sundquist, Hannu K., 4,996,225, Cl. 514-428.000.

Blanding, Douglass L., to Eastman Kodak Company. Support means for electrophotographic film core and associated elements. 4,996,563, Cl. 355-212.000.

Blankenship, Michael: *See*—
Steinke, David M.; Blankenship, Michael; Satterfield, Marshall G.; and Gardner, Philip D., Sr., 4,996,090, Cl. 428-71.000.

Blasioli, Patrizia: *See*—
Greco, Alberto; Giordano, Sergio; Pozzi, Enrico; and Blasioli, Patrizia, 4,996,283, Cl. 528-80.000.

Blass, Jacob M., to Westone Products Limited. Dental floss and tape. 4,996,056, Cl. 424-443.000.

Blaushild, Ronald M.: *See*—
Bhatt, Pankaj N.; and Blaushild, Ronald M., 4,996,018, Cl. 376-203.000.

Blendax GmbH: *See*—
Wagner, Helmar R., 4,996,042, Cl. 424-54.000.

Block, Barry: *See*—
Zias, Arthur R.; Block, Barry; Mapes, Kenneth W.; Nystrom, Norman L.; and Cadwell, Robert M., 4,996,627, Cl. 361-283.000.

Blocker, Wesley C.: *See*—
Eisenbraun, Allan A.; and Blocker, Wesley C., 4,996,254, Cl. 524-104.000.

Blonder, Greg E.; Blyler, Lee L., Jr.; and Grimes, Gary J., to AT&T Bell Laboratories. Optical splitter/combiner with an adiabatic mixing region. 4,995,686, Cl. 350-96.150.

Bloom, Joy S., to Du Pont de Nemours, E. I., and Company. Thermoformable polyaryletherketone sheet. 4,996,287, Cl. 528-125.000.

Blyler, Lee L., Jr.: *See*—
Blonder, Greg E.; Blyler, Lee L., Jr.; and Grimes, Gary J., 4,995,686, Cl. 350-96.150.

Blythin, David J.: *See*—
Duelfer, Timothy; and Blythin, David J., 4,996,212, Cl. 514-293.000.

Board of Regents, The University of Texas System: *See*—
Bunegin, Leonid; and Albin, Maurice S., 4,995,401, Cl. 128-748.000.

Board of Regents University of Texas System: *See*—
Walls, W. Alan; Estes, Elvin; Manifold, Steve M.; Spann, Michael L.; and Gully, John H., 4,996,016, Cl. 264-229.000.

Bobst SA: *See*—
Zuliani, Sandro, 4,995,564, Cl. 242-67.10R.

BOC Group, plc, The: *See*—
Wycliffe, Henryk, 4,995,794, Cl. 417-431.000.

BOC, Inc.: *See*—
Halpern, Donald F.; and Robin, Mark L., 4,996,371, Cl. 568-683.000.

Bockris, John O'M.: *See*—
Dandapani, Balasubramaniam; and Bockris, John O'M., 4,995,952, Cl. 204-129.000.

Boda, Janos: *See*—
Ferenczi, Gyorgy; Erdelyi, Katalin; Somogyi, Maria; Boda, Janos; Fule, Gyorgy; and Aszodi, Gabor, 4,995,939, Cl. 156-627.000.

Bodnar, Richard J.: *See*—
Howell, David A.; Hydeman, Jeffrey E.; Slater, Jeffrey L.; Bodnar, Richard J.; Golick, Leonard R.; Sekera, Robert S.; and Roth, Charles H., Jr., 4,995,158, Cl. 29-723.000.

Bodor, Nicholas S., to Bodor, Nicholas S. Soft steroids having anti-inflammatory activity. 4,996,335, Cl. 552-610.000.

Boegli, Werner: *See*—
Alznauer, Kurt; Baumgartner, Michael; Boegli, Werner; and Brauer, Jurgen, 4,995,254, Cl. 72-342.100.

Boehringer Ingelheim KG: *See*—
Weber, Karl-Heinz; Walther, Gerhard; Schneider, Claus; Hinzen, Dieter; Kuhn, Franz J.; and Lehr, Erich, 4,996,224, Cl. 514-424.000.

Boehringer, John R.; Nelson, Jay B.; and Karpowicz, John, to Boehringer Laboratories. Pneumotach and components therefor. 4,995,400, Cl. 128-725.000.

Boehringer Laboratories: *See*—
Boehringer, John R.; Nelson, Jay B.; and Karpowicz, John, 4,995,400, Cl. 128-725.000.

Boehringer Mannheim GmbH: *See*—
Tsaklakidis, Christos; Bosies, Elmar; Schultz, Michael; Haag, Rainer; Herrmann, Dieter; and Pahlke, Wulf, 4,996,219, Cl. 514-341.000.

Boeing Company, The: *See*—
Anderson, Patrick L.; Sarr, Dennis P.; and Simpson, Mark B., 4,996,492, Cl. 324-687.000.
Houk, Theodore L.; and Falk, R. Aaron, 4,996,527, Cl. 341-83.000.
Stephenson, Martin F., 4,995,575, Cl. 244-216.000.
Woods, Quentin T., 4,995,146, Cl. 29-281.300.

Boettcher, Klaus: *See*—
Kanne, Friedrich; Pfleger, Klaus; Glomb, Hans; Arnold, Gerhard; Boettcher, Klaus; and Kursawe, Siegfried, 4,996,026, Cl. 422-106.000.

Bogdanovsky, Valentin A.: *See*—
Paton, Boris E.; Vasiliev, Vsevolod V.; Bogdanovsky, Valentin A.; Shelekhov, Konstantin V.; Gavva, Viktor M.; Bigdash, Vladimir D.; Tabunschik, Ivan A.; and Ilchishin, Andrei P., 4,996,409, Cl. 219-130.010.

Boin, Joyce R.: *See*—
Hirn, Doris D.; Boin, Joyce R.; and Breakwell, Susan L., 4,995,412, Cl. 135-67.000.

Boisseau, Jean L., to Vega Automation. Process for breaking and removing a tie surrounding a bundle. 4,995,784, Cl. 414-786.000.

Bolze, Manfred; and Drawert, Manfred, to Schering AG. Polyester amides containing imide groups, process for their production and their use as hot-melt adhesives. 4,996,290, Cl. 528-272.000.

Bonacorsi, Dennis L.; McGeachy, Donald E.; and Smith, Alan L., to Numatics, Incorporated. Lock-out valve with controlled restart. 4,995,421, Cl. 137-383.000.

Bonne, Ulrich; and Matthys, Robert J., to Gas Research Institute. Selective gas detecting apparatus. 4,996,431, Cl. 250-343.000.

Bonomi, Giovanni B.; and Oldani, Battistino, to IMTA. Robotically controlled multi-task end effector. 4,995,148, Cl. 29-26.00A.

Bonora, Anthony C.; and Rosenquist, Frederick T., to Asyst Technologies, Inc. Sealable transportable container having improved latch mechanism. 4,995,430, Cl. 141-98.000.

Booth, Roy E.: *See*—
Berkebile, Donald C.; Lee, Donald M.; Veneziano, Larry D.; Lauer, Joseph J.; Booth, Roy E.; and Hettinger, William P., 4,996,037, Cl. 423-447.400.

Borden, Thomas E.; Nestor, Charles R.; and Solano, David W., to Raychem Corporation. Electrical connector. 4,995,822, Cl. 439-161.000.

Borg-Warner Corporation: *See*—
Payvar, Parviz, 4,995,500, Cl. 192-107.00R.

Borger, Georg; Kahlcke, Hartwig; and Littmann, Ludwig, to Braun Aktiengesellschaft. Motor-driven can opener. 4,995,164, Cl. 30-423.000.

Bosies, Elmar: *See*—
Tsaklakidis, Christos; Bosies, Elmar; Schultz, Michael; Haag, Rainer; Herrmann, Dieter; and Pahlke, Wulf, 4,996,219, Cl. 514-341.000.

Boston S.p.A.: *See*—
Greco, Alberto; Giordano, Sergio; Pozzi, Enrico; and Blasioli, Patrizia, 4,996,283, Cl. 528-80.000.

Bott, Kaspar; Hoffmann, Herwig; Scheidmeir, Walter; and Trapp, Horst, to BASF Aktiengesellschaft. Preparation of alkanols which are substituted in the 1 position by aromatic or heterocyclic radicals. 4,996,324, Cl. 546-339.000.

Bottenbruch, Ludwig; Ruppert, Heinrich; Isaacs, Neil S.; and Latham, Kenneth G., to Bayer Aktiengesellschaft. Process for producing dihydroxydiarylalkanes. 4,996,373, Cl. 568-727.000.

Botts, David M.: *See*—
Vermes, Sheldon A.; Botts, David M.; and Peterson, Charles A., 4,995,976, Cl. 210-266.000.
Boudreau and Collie: *See*—
Collie, Russell, 4,995,186, Cl. 40-591.000.
Bourne, Gary L.: *See*—
Meikrantz, David H.; Bourne, Gary L.; McFee, John N.; Burdge, Bradley G.; and McConnell, John W., Jr., 4,995,916, Cl. 134-22.160.
Bourque, Michael R.: *See*—
Landry, John C.; and Bourque, Michael R., 4,995,641, Cl. 283-67.000.
Bowman, Robert G.; Molzahn, David C.; and Hartwell, George E., to Dow Chemical Company, The. Catalytic reforming of alkylenea-mines to linearly-extended polyalkylenepolyamines. 4,996,363, Cl. 564-470.000.
Bradshaw, Jerald S.; Lee, Milton L.; and Markides, Karin E. Novel oligoethylene oxide-containing alkenes, alkoxysilanes, and polysilox-anes. 4,996,277, Cl. 528-15.000.
Brain, Archibald I. Artificial airway device. 4,995,388, Cl. 128-207.150.
Brand, Glen: *See*—
Chew, Timmy L.; and Brand, Glen, 4,995,422, Cl. 137-504.000.
Brand Hydraulics Co. Inc.: *See*—
Chew, Timmy L.; and Brand, Glen, 4,995,422, Cl. 137-504.000.
Brandes, Wilhelm: *See*—
Lindner, Werner; and Brandes, Wilhelm, 4,996,208, Cl. 514-258.000.
Brauer, Jurgen: *See*—
Alznauer, Kurt; Baumgartner, Michael; Boegli, Werner; and Brauer, Jurgen, 4,995,254, Cl. 72-342.100.
Braun Aktiengesellschaft: *See*—
Borger, Georg; Kahlcke, Hartwig; and Littmann, Ludwig, 4,995,164, Cl. 30-423.000.
Braunsberger, Ulrich: *See*—
Loffler, Markus; and Braunsberger, Ulrich, 4,996,455, Cl. 310-12.000.
Brazier, Gary B., to Bard Limited. Catheter. 4,995,868, Cl. 604-105.000.
Breakwell, Susan L.: *See*—
Hirn, Doris D.; Boin, Joyce R.; and Breakwell, Susan L., 4,995,412, Cl. 135-67.000.
Brecy, Andre ; and Poinsot, Philippe, to Bull S.A. Apparatus for separating and recovering solid developer particles transported by a gaseous flow. 4,996,538, Cl. 346-74.300.
Breed, David S., to Automotive Technologies International, Inc. Vehicle crush zone crash sensor. 4,995,639, Cl. 280-735.000.
Bresenham, Jack E.: *See*—
Butler, Nicholas D.; Gay, Adrian C.; and Bresenham, Jack E., 4,996,653, Cl. 364-521.000.
Bridgestone Corporation: *See*—
Enoki, Yasutaka; Makino, Shigeo; and Murase, Shinji, 4,995,437, Cl. 152-209.00R.
Tanuma, Itsuo; Otsuru, Hiromi; and Honda, Toshio, 4,996,110, Cl. 428-343.000.
Bridgestone/Firestone, Inc.: *See*—
Summers, Roger L., 4,995,531, Cl. 221-75.000.
Briggs & Stratton Corporation: *See*—
Gonnering, John B.; and Tharman, Paul A., 4,995,357, Cl. 123-198.0DC.
Brighigna, Mario, to VM Motori S.P.A. Malfunction override device for the fuel injection systems of compression-ignition engines. 4,995,362, Cl. 123-365.000.
Brighton, Jeffrey E.; and Verret, Douglas P., to Texas Instruments Incorporated. Self-aligned tungsten-filled via process and via formed thereby. 4,996,133, Cl. 430-313.000.
Brinkmann Corporation, The: *See*—
Lovett, Robert H., 4,996,636, Cl. 362-431.000.
Brisbin, Brian; McCaffrey, Felim; and Sheffield, Peter, to Stadium Consultants International Inc. Retractable roof for stadium structure. 4,995,203, Cl. 52-6.000.
Briscoe, Terry L.; and Sprunger, Paul C., to Esco Corporation. Replaceable wear element, assembly and method. 4,995,176, Cl. 37-141.00R.
Bristol Compressors, Inc.: *See*—
Loprete, Joseph F., 4,995,791, Cl. 417-366.000.
Britcher, Susan F.: *See*—
Baker, Raymond; Leeson, Paul D.; and Britcher, Susan F., 4,996,211, Cl. 514-289.000.
British Steel PLC: *See*—
Kegan, Neil J.; Hitchens, Ian; Robertson, Thomas; and Whitehouse, Paul A., 4,995,592, Cl. 266-44.000.
Broadhurst, Jeffrey C., to Woodville Polymer Engineering Limited. Radar reflectors. 4,996,536, Cl. 343-912.000.
Bronn, William R.; Silver, Spencer F.; and Joseph, Eugene G., to Minnesota Mining and Manufacturing Company. Method of making condensed phase polymers. 4,996,266, Cl. 525-271.000.
Brooke, John, to Canada, Her Majesty the Queen in right of, as represented by the Minister of Energy, Mines & Resources. Underwater control system. 4,996,673, Cl. 367-131.000.
Brooks, Gary L., to Sta-Rite Industries, Inc. Tank clamping mechanism. 4,995,523, Cl. 220-4.120.
Brooks, Joan. Instant face lift. 4,995,379, Cl. 128-76.00B.
Brooks, Joan E.; and Sznyter, Laura A., to New England Biolabs, Inc. Method for producing the Eag I restriction endonuclease and methylase. 4,996,151, Cl. 435-172.300.
Brother Kogyo Kabushiki Kaisha: *See*—
Fujita, Kazuhiko; and Bessho, Yoshinori, 4,995,726, Cl. 356-349.000.
Hirata, Keiichi; Kawakami, Yasushi; Miura, Tomoko; Mukai, Miyako; Ban, Tomohiro; and Furukawa, Akihiro, 4,995,739, Cl. 400-63.000.
Kiyoharu, Hayakawa, 4,996,554, Cl. 355-27.000.
Kobayashi, Norio, 4,995,740, Cl. 400-63.000.
Sangyoji, Kazuo; and Kawahara, Hiroshi, 4,996,552, Cl. 355-1.000.
Takagi, Osamu, 4,996,553, Cl. 355-27.000.
Tanaka, Takafumi, 4,995,328, Cl. 112-453.000.
Yamada, Shiro; Hirata, Keiichi; Oishi, Minoru; Morimoto, Yoshinari; Furukawa, Akihiro; and Kawasumi, Atsuko, 4,996,640, Cl. 364-200.000.
Yokoi, Takeshi; Nakamura, Shigeo; and Yamanaka, Hiroshi, 4,995,745, Cl. 400-605.000.
Brown, Donald G.; and Miyata, Gary T., to United States of America, Army. Load balanced coolant fitting. 4,995,644, Cl. 285-41.000.
Brown, Gregory P.: *See*—
Grubbs, Robert A.; and Brown, Gregory P., 4,996,534, Cl. 342-195.000.
Brown, John W., to Qantix Corporation. Anti-glare filter with improved viewing area. 4,995,701, Cl. 350-276.00R.
Brown, Paul D.; Godecker, William J.; and Parme, Charles B., to Sundstrand Corporation. Compressor system with self contained lubricant sump heater. 4,995,792, Cl. 417-366.000.
Brule, Francois; and Chansavoir, Alain, to Essilor International Cie General d'Optique. Contour reading device suitable for use on eyeglass frames. 4,995,170, Cl. 33-551.000.
Brunner, Hans-Georg, to Ciba-Geigy Corporation. Novel herbicides. 4,995,902, Cl. 71-94.000.
Brunson, Gordon R., to AT&T Bell Laboratories. Electronic messaging systems with additional message storage capability. 4,996,704, Cl. 379-67.000.
Brunswick Corporation: *See*—
Lulloff, Ricky H., 4,995,233, Cl. 60-324.000.
Brussel, Richard, to Krupp Maschinentechnik Gesellschaft mit beschrankter Haftung. Gripping apparatus for transporting a panel of adhesive material. 4,995,778, Cl. 414-20.000.
Brussel, Richard, to Krupp Maschinentechnik GmbH. Method of producing mat strips from wide panels of adhesive material covered with release layers and apparatus for implementing the method. 4,995,933, Cl. 156-247.000.
Bruza, Kenneth J., to Dow Chemical Company, The. Cyclobutarene ketoanhydride and ketocag21xy monomeric and polymeric compositions. 4,996,288, Cl. 528-220.000.
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., to Eastman Kodak Company. Titanium activated hafnia and/or zirconia host phosphor containing a selected rare earth. 4,996,003, Cl. 252-301.40F.
Bryan Steam Corporation: *See*—
Rampley, Thomas N.; and Hoffarth, Paul G., 4,995,807, Cl. 431-9.000.
Bryan, William J., to Combustion Engineering, Inc. Bottom nozzle to guide tube connection. 4,996,021, Cl. 376-446.000.
BT&D Technologies Limited: *See*—
Regnault, John C., 4,995,546, Cl. 228-123.000.
Buchanan, W. A.; and Heiter, G. L., to AT&T Bell Laboratories. Coaxial transmission line to strip line coupler. 4,995,815, Cl. 439-63.000.
Bucheler, Manfred; Gehringer, Hans; Klinksiek, Bernd; and Koglin, Bernd, to Bayer Aktiengesellschaft. Preparation of pharmaceutical or cosmetic dispersions. 4,996,004, Cl. 252-314.000.
Buchwald, Hans; and Raschkowski, Boleslaus, to Kali-Chemie AG. Dichlorotrifluoroethane-containing mixtures. 4,995,908, Cl. 106-38.220.
Buck, Robert J. Safety attachments for ladders. 4,995,476, Cl. 182-206.000.
Buckler, Robert T.; and Hatch, Robert P., to Miles Inc. Optical indicator coumarins and methods for their preparation and use. 4,996,332, Cl. 549-285.000.
Bucks, Rodney R.: *See*—
Buettner, Albert V.; Bucks, Rodney R.; and Contois, Lawrence E., 4,996,124, Cl. 430-59.000.
Buday, John M., to Continental Coach Ltd. Hitch for motor home assembly. 4,995,664, Cl. 296-165.000.
Buer, Jeffrey J., to Midamerica Recycling Company. Can flattening machine. 4,995,314, Cl. 100-152.000.
Buettner, Albert V.; Bucks, Rodney R.; and Contois, Lawrence E., to Eastman Kodak Company. Photoconductor element, regenerating methods and elements useful therein. 4,996,124, Cl. 430-59.000.
Bugianesi, Robert L.: *See*—
Biftu, Tesfaye; Bugianesi, Robert L.; Girotra, Nirindar N.; Ponpipom, Mitree M.; Sahoo, Soumya P.; and Kuo, Chan H., 4,996,203, Cl. 514-231.500.
Bull HN Information Systems, Inc.: *See*—
Cattaneo, Sergio, 4,995,742, Cl. 400-124.000.
Bull S.A.: *See*—
Brecy, Andre ; and Poinsot, Philippe, 4,996,538, Cl. 346-74.300.
Bullock Mfg. Pty. Ltd: *See*—
Jackson, Roy J., 4,995,648, Cl. 285-406.000.
Bunegin, Leonid; and Albin, Maurice S., to Board of Regents, The University of Texas System. Device for measuring anterior fontanelle pressure. 4,995,401, Cl. 128-748.000.

Burdett, Kenneth A.: *See*—
Lee, Guo-shuh J.; Burdett, Kenneth A.; and Maj, Joseph J., 4,996,353, Cl. 562-412.000.

Burdge, Bradley G.: *See*—
Meikrantz, David H.; Bourne, Gary L.; McFee, John N.; Burdge, Bradley G.; and McConnell, John W., Jr., 4,995,916, Cl. 134-22.160.

Burge, Elaine R.: *See*—
Burge, Leonard F., 4,995,439, Cl. 157-1.170.

Burge, Leonard F., to Burge, Leonard F.; and Burge, Elaine R. Tire bead breaker. 4,995,439, Cl. 157-1.170.

Burgess, James F.: *See*—
Webster, Harold F.; Neugebauer, Constantine A.; and Burgess, James F., 4,996,116, Cl. 428-627.000.

Burk, Johst H.: *See*—
Greco, Carl C.; and Burk, Johst H., 4,996,300, Cl. 534-15.000.

Burkinshaw, Jeffrey R.; and Gingerich, Leo L., to Phillips Petroleum Company. Inert purge in catalytic dimerization of olefins. 4,996,383, Cl. 585-516.000.

Burlett, Donald J.: *See*—
Pyke, James B.; Bauer, Richard G.; and Burlett, Donald J., 4,996,262, Cl. 525-177.000.

Burley, David A. Display case for sportscards. 4,995,508, Cl. 206-44.00B.

Burnham, William L.: *See*—
Schappler, Joseph J.; Glogan, David J.; and Burnham, William L., 4,996,548, Cl. 354-149.110.

Burns, David W.: *See*—
Guckel, Henry; and Burns, David W., 4,996,082, Cl. 427-99.000.

Burris, Leslie: *See*—
Pos, David S.; Burris, Leslie; Steunenberg, Robert K.; and Tomczuk, Zygmunt, 4,995,948, Cl. 204-1.500.

Burton, Camille: *See*—
Louison, Bernard; and Burton, Camille, 4,995,177, Cl. 38-88.000.

Butler, Nicholas D.; Gay, Adrian C.; and Bresenham, Jack E., to International Business Machines Corporation. Line generation in a display system. 4,996,653, Cl. 364-521.000.

Byers, Charles H.: *See*—
Scott, Charles D.; Woodward, Charlene A.; and Byers, Charles H., 4,995,985, Cl. 210-679.000.

Byers, Larry L.; Tsang, Kay; Scheuneman, James H.; and Svenkeson, Penny, to Unisys Corporation. Fault capture/fault injection system. 4,996,688, Cl. 371-16.500.

Byrkett, Bruce E., to Seattle Silicon Corporation. Overvoltage resistor and method for its manufacture. 4,996,512, Cl. 338-306.000.

Byrne, William J., to Arthur Guinness Son & Company (Dublin) Limited. Method of packaging a beverage. 4,995,218, Cl. 53-410.000.

Cableco: *See*—
Poumey, Michel; and Charvet, Jacques, 4,996,405, Cl. 219-10.493.

Cabot Corporation: *See*—
Falco, Robert N., 4,995,824, Cl. 439-290.000.

Cadbury Schweppes Proprietary Limited: *See*—
Gracey, Michael; Hopkins, Frank; Robinson, Jennifer; and Snow, Stephen, 4,996,232, Cl. 514-474.000.

Cadmus, Martin C.; and Slodki, Morey E., to United States of America, Agriculture. Heat-stable, salt-tolerant microbial xanthanase. 4,996,153, Cl. 435-209.000.

Cadwell, Robert M.: *See*—
Zias, Arthur R.; Block, Barry; Mapes, Kenneth W.; Nystrom, Norman L.; and Cadwell, Robert M., 4,996,627, Cl. 361-283.000.

Calabrese, Joseph A.: *See*—
Mugnolo, Frank A.; Mugnolo, Anthony; and Calabrese, Joseph A., 4,995,652, Cl. 292-202.000.

Calgene, Inc.: *See*—
Crossway, Anne; and Houck, Catherine M., 4,996,144, Cl. 435-6.000.

Callaway Golf Company: *See*—
Parente, Richard E.; De La Cruz, Richard; and Helmstetter, Richard C., 4,995,609, Cl. 273-80.200.

Cambier, James L.: *See*—
Warnicki, Joseph W.; Rehkopf, Paul G.; Cambier, James L.; and Strods, Salvins J., 4,995,716, Cl. 351-212.000.

Cameron, Frank L.; and Smith, George A., to Westinghouse Electric Corp. Method of assembling a controlled seal for an expulsion fuse. 4,995,886, Cl. 29-623.000.

Campbell Soup Company: *See*—
Dahlberg, Kurt R., 4,996,390, Cl. 800-220.000.

Canada, Her Majesty the Queen in right of, as represented by the Minister of Energy, Mines & Resources: *See*—
Brooke, John, 4,996,673, Cl. 367-131.000.

Canada, National Research Council of Canada/Conseil de Recherches: *See*—
Guiver, Michael D.; and Kutowy, Oleh, 4,996,271, Cl. 525-537.000.

Canadian A.S.E. Limited: *See*—
Croft, George, 4,995,669, Cl. 297-379.000.

Canoga Industries, Inc.: *See*—
Freehauf, Eugene G., 4,996,631, Cl. 361-415.000.

Canon Kabushiki Kaisha: *See*—
Fujiwara, Takutoshi; and Konishi, Motofumi, 4,996,664, Cl. 364-900.000.
Kadowaki, Toshihiro; Ohnishi, Tetsuya; Katoh, Koichi; Suzuki, Yasumichi; and Honma, Toshio, 4,996,591, Cl. 358-80.000.
Kakizawa, Katsuhiro, 4,996,708, Cl. 379-156.000.
Kashida, Motokazu; Masui, Toshiyuki; Fukatsu, Tsutomu; Takei, Masahiro; Takahashi, Kouji; and Sasatani, Tomohiko, 4,996,607, Cl. 360-18.000.
Kawai, Tatsundo; Ogura, Makoto; Tomoda, Koji; Ichihashi, Hiroo; Seitoh, Shinichi; Kuroda, Yasuo; and Noguchi, Hiroyuki, 4,996,606, Cl. 358-475.000.
Matsuyama, Jinsho, 4,995,341, Cl. 118-723.000.
Ohashi, Masashi; Toyama, Yoshikuni; Kagiura, Kazuo; Maruyama, Hiroyoshi; Shiratori, Tatsuya; Shirai, Masanari; and Ando, Eiichi, 4,995,601, Cl. 271-127.000.
Sugiura, Muneharu, 4,995,708, Cl. 350-427.000.
Tateno, Tetsuya, 4,996,443, Cl. 307-264.000.
Yoshinaga, Kazuo; Miyazaki, Takeshi; Ohnishi, Toshikazu; Kurabayashi, Yutaka; Takasu, Yoshio; and Kobayashi, Tadashi, 4,995,705, Cl. 350-350.00S.

Cantor, Joseph L. Anti-theft handbag. 4,995,436, Cl. 150-102.000.

Cantrell, Philip E.: *See*—
Gerstenberger, Roland W.; and Cantrell, Philip E., 4,995,150, Cl. 28-119.000.

Capital City Products Company: *See*—
Ertle, Raymond T.; and Arbaugh, Robert P., 4,996,001, Cl. 252-99.000.

Carey, John Mr. & Mrs.: *See*—
Carey, Kevin, 4,995,647, Cl. 285-161.000.

Carey, Kevin, to Carey, John Mr. & Mrs. Portal semicylindrical electrical connector. 4,995,647, Cl. 285-161.000.

Carey, Michael D., to American Standard Inc. Liquid line service and process device. 4,995,239, Cl. 62-149.000.

Carl Freudenberg, Firma: *See*—
Beicht, Bernd; Heinemann, Joachim; Keller, Frank; and Tinz, Reinhard, 4,995,433, Cl. 141-312.000.
Daimler, Berthold, 4,995,304, Cl. 92-92.000.

Carl Ullrich Peddinghaus: *See*—
Pfluger, Ludwig, 4,995,599, Cl. 269-32.000.

Carlhoff, Christoph; Lorenzen, Claus-Jurgen; and Nick, Klaus-Peter, to Fried. Krupp Gesellschaft Mit Beschrankter Haftung. Method and apparatus for optically coupling an element analysis system and a laser to liquid metal in a melting vessel. 4,995,723, Cl. 356-318.000.

Carlin, Brian A. C.; Healey, John N. C.; Leonard, Graham S.; and Tovey, Geoffrey D., to Smith Kline & French Laboratories Limited. Pharmaceutical formulations. 4,996,222, Cl. 514-400.000.

Carpanzano, Anthony E.: *See*—
Kelleher, William J.; and Carpanzano, Anthony E., 4,996,047, Cl. 424-79.000.

Carpenter, Neil M.: *See*—
Fleet, George W. J.; Winchester, Bryan; and Carpenter, Neil M., 4,996,329, Cl. 548-453.000.

Carrier Corporation: *See*—
Robertson, Gerald F.; Moyer, Ross A.; and McManus, John R., 4,995,252, Cl. 72-194.000.

Carrier, Gary W.: *See*—
Phan, Hieu D.; Carrier, Gary W.; Stockl, Rebecca R.; Tortorici, Frank J.; and Wulf, R. Gary, 4,996,252, Cl. 524-88.000.

Carroll, Noel; and Kalnins, Charles M., to Conoco Specialty Products Inc. Separating liquids. 4,995,989, Cl. 210-788.000.

Carrs Paper Limited: *See*—
Bevan, Leonard N.; Moore, Colin R.; and Alkinson, Victor G., 4,996,184, Cl. 503-226.000.

Carter, Jeanne K.; and Silva, Robert F., to United States of America, Agriculture. Avian herpesvirus amplicon as a eucaryotic expression vector. 4,996,152, Cl. 435-172.300.

Casagrande, Mario, to AMP Incorporated. Electrical connector support. 4,995,831, Cl. 439-557.000.

Case, Allen W., Jr.; and Penney, Carl M., to General Electric Company. Input/output ports for a lasing medium. 4,996,693, Cl. 372-66.000.

Case, M. Bruce: *See*—
Torres, Daniel L.; Gullikson, Darryl C.; Case, M. Bruce; and Ncher, Ralph A., 4,995,413, Cl. 137-1.000.

Casey, Daniel T., to AMP Incorporated. Module retention/ejection system. 4,995,821, Cl. 439-157.000.

Casio Computer Co., Ltd.: *See*—
Kashio, Yukio; and Arai, Yoneaki, 4,995,294, Cl. 84-738.000.
Nomura, Yoshio, 4,995,292, Cl. 84-726.000.

Caspari, Gunter: *See*—
Ernst, Andreas B.; and Caspari, Gunter, 4,996,367, Cl. 568-33.000.

Cassady, R. J.: *See*—
Smith, Richard D.; Knowles, Steve; Cassady, R. J.; Smith, William; and Simon, Mark A., 4,995,231, Cl. 60-203.100.

Castellon, Melchor D. Fork for cardan joints and method of forming same. 4,995,849, Cl. 464-134.000.

Catalayoud, Louis; and Gerard, Michel, to Cogema Compagnie Generale des Matieres Nucleaires. Storage container for radioactive waste. 4,996,019, Cl. 376-272.000.

Caterpillar Industrial Inc.: *See*—
Mikkelsen, Jan; and Sorlie, Kjell, 4,995,469, Cl. 180-89.130.

Catheter Technology Corporation: *See*—
Nichols, Colin J.; Nordgren, Gregory N.; and Moorehead, Harvey R., 4,995,863, Cl. 604-247.000.

Cattaneo, Sergio, to Bull HN Information Systems, Inc. Needle printing head. 4,995,742, Cl. 400-124.000.

Cecconi, Bert T. Component part removable partial denture and method for designing and making same. 4,995,811, Cl. 433-190.000.

Cech, Jay: *See*—
Young, Peter L.; Cech, Jay; and Li, Kin, 4,996,584, Cl. 357-71.000.

Central Glass Company, Limited: *See*—
Oshio, Hideki; Mishumi, Sadaharu; Yagii, Kiyoshi; Yoshikawa, Satoshi; and Murata, Katsuyoshi, 4,996,379, Cl. 570-176.000.

Centre De Recherches Metallurgigues: *See*—
Naveau, Paul; and Wilmotte, Stephan, 4,995,446, Cl. 164-437.000.

Cervola, William F. Fertilizer sprinkler apparatus. 4,995,418, Cl. 137-268.000.

Ceschel, Giancarlo: *See—*
Valentini, Luigi; and Ceschel, Giancarlo, 4,995,385, Cl. 128-203.210.

Cevasco, Albert A., to American Cyanamid Company. Method for the preparation of dialkyl dichlorosuccinates. 4,996,350, Cl. 560-192.000.

Chadwick, Gary L.; and Johnson, Joe F., to Micron Technology, Inc. Real time monitoring of remote signals in an industrial environment. 4,996,655, Cl. 364-550.000.

Chai, Bruce H. T., to Allied-Signal Inc. Epitaxial Ba-Y-Cu-O superconductor film. 4,996,187, Cl. 505-1.000.

Chainlight International S.A.: *See—*
Morales, Rendell A., 4,995,823, Cl. 439-226.000.

Chamberlain, Neal C.: *See—*
Yourgalite, Ray A.; Moore, Malcolm; Chamberlain, Neal C.; Becicka, Kenneth F.; Hilgeman, Samuel J.; and Moore, Kevin D., 4,995,224, Cl. 53-540.000.

Champalaune, Jean-Claude; Corveler, Yvon; and Coutard, Andre , to Kaufler S. A. Apparatus for continuously producing substantially parallelepipedal pieces of meat. 4,995,803, Cl. 425-190.000.

Chan, Dominic M.: *See—*
Smothers, Willaim K.; Monroe, Bruce M.; and Chan, Dominic M., 4,996,120, Cl. 430-2.000.

Chaney, Raymond J., to Renishaw plc. Optical detection system with means for equalizing ambient light levels at multiple detectors. 4,996,416, Cl. 250-225.000.

Chang, Eui Y., to SamSung Electronics Co., Ltd. Evaporator for ice maker. 4,995,245, Cl. 62-515.000.

Chang, Mau-Chung F.; and Asbeck, Peter M., to Rockwell International Corporation. Self-aligned dielectric assisted planarization process. 4,996,165, Cl. 437-31.000.

Chang, Michael N.; Chiang, Yuan-Ching P.; Heck, James V.; and Lewis, Michael D., to Merck & Co., Inc. Triyne cyclic carbonates. 4,996,231, Cl. 514-467.000.

Chang, Wei K.: *See—*
Berger, Joel G.; Chang, Wei K.; Gold, Elijah H.; and Elliott, Arthur J., 4,996,202, Cl. 514-213.000.

Chansavoir, Alain: *See—*
Brule, Francois; and Chansavoir, Alain, 4,995,170, Cl. 33-551.000.

Chao, Kuo-Hua; Dutta, Tamal K.; and Slaugh, Lynn H., to Shell Oil Company. Process for the oxidation of alcohols to aldehydes/acids/-esters. 4,996,007, Cl. 260-410.90R.

Chariot Star, Inc.: *See—*
Kaplan, Samuel S.; and Dill, Donald S., 4,995,300, Cl. 82-12.000.

Charvet, Jacques: *See—*
Poumey, Michel; and Charvet, Jacques, 4,996,405, Cl. 219-10.493.

Chaum, David L. Selected-exponent signature systems. 4,996,711, Cl. 380-30.000.

Chen, Min-Liang, to AT&T Bell Laboratories. Method of making electrical contacts to gate structures in integrated circuits. 4,996,167, Cl. 437-40.000.

Chen, Sheng N. Large tire bolt fixing tool. 4,995,296, Cl. 81-57.440.

Chen, Wei: *See—*
Ackerman, Joseph J. H.; and Chen, Wei, 4,996,481, Cl. 324-318.000.

Cheng, Chiang-Ming. Picture plate using both transpiercing light and reflection light. 4,995,185, Cl. 40-582.000.

Cheng, Kuan H. Method and apparatus for performing fair card play. 4,995,615, Cl. 273-292.000.

Chesnier, Patrice: *See—*
Auvity, Michel; and Chesnier, Patrice, 4,995,554, Cl. 236-51.000.

Chew, Timmy L.; and Brand, Glen, to Brand Hydraulics Co. Inc. Flow control valve. 4,995,422, Cl. 137-504.000.

Chiang, Yuan-Ching P.: *See—*
Chang, Michael N.; Chiang, Yuan-Ching P.; Heck, James V.; and Lewis, Michael D., 4,996,231, Cl. 514-467.000.

Chiba, Yukio: *See—*
Morita, Hirobumi; Matsuzaki, Eiichi; Chiba, Yukio; and Kato, Shigeo, 4,995,338, Cl. 118-410.000.

Chicago Bridge & Iron Technical Services Company: *See—*
Kooy, Richard J.; Andrepont, John S.; Gyger, Roger F.; and Tyree, Lewis, Jr., 4,995,234, Cl. 60-648.000.

Chichibu Cement Co., Ltd.: *See—*
Yoshida, Kinoto; Fujii, Morizumi; Tsuda, Tokihiro; Suda, Shigeo; Kodama, Osamu; Kuroe, Kazuro; Tanikawa, Takumi; Nishimura, Michihiko; and Munakata, Hideyuki, 4,995,932, Cl. 156-242.000.

Chida, Noritaka: *See—*
Yoshioka, Takeo; Chida, Noritaka; Watanabe, Azuma; Fukagawa, Yasuo; and Ishikura, Tomoyuki, 4,996,314, Cl. 540-364.000.

Ching, Ta Y.; and Lin, Lon-Tang W., to Henkel Research Corporation. Vicinal disubstituted carboxylic acids and silylated derivatives. 4,996,342, Cl. 556-437.000.

Chiou, Chuang C. Combination lock for the shift rod and the handbrake rod of a car. 4,995,250, Cl. 70-238.000.

Chiriatti, Antonio; and Masini, Marco, to SGS-Thomson Microelectronics srl. Programmable static selection circuit for programmable devices. 4,996,451, Cl. 307-468.000.

Chisso Corporation: *See—*
Saho, Takahiro; Akutsu, Yoshinori; Nakano, Takaharu; and Ohtake, Nobumasa, 4,996,280, Cl. 528-15.000.

Cho, Tae-Young, to Samsung Electronics Co., Ltd. Method of controlling the electric power supplied to a modem. 4,996,706, Cl. 379-93.000.

Choi, Wan-Kyoon; and Kim, Jong-Whan, to SamSung Electronics Co. Ltd. Anti-oxidation system of a wire bonder using a copper wire. 4,995,552, Cl. 228-179.000.

Christiansen, Clead M. Woodworking lathe tailstock assembly. 4,995,434, Cl. 142-48.000.

Christiansen, Gary: *See—*
Schantz, Spencer; Janz, Ronald J.; Christiansen, Gary; and Sager, Steven, 4,995,650, Cl. 292-201.000.

Christiansen, Robert A.; and DiGirolamo, Joel A., to International Business Machines Corporation. Circuit board with self-supporting connection between sides. 4,996,629, Cl. 361-400.000.

Chrysler Corporation: *See—*
Jaynes, Alan, 4,995,891, Cl. 55-419.000.

Chu, David: *See—*
Tambe, Atul; Chu, David; and Cosart, Lee D., III, 4,996,474, Cl. 324-78.00D.

Chu, Tak-Kin, to United States of America, Navy. Design for electronic spectrally tunable infared detector. 4,996,579, Cl. 357-30.000.

Chu, Wing F.; and Rohr, Franz J., to BBC Aktiengesellschaft, Brown, Boveri & Cie. High temperature protective coating. 4,996,117, Cl. 428-633.000.

Chyrsler Corporation: *See—*
Horansky, John; and Winalis, Kenneth L., 4,995,660, Cl. 293-132.000.

Ciba-Geigy Corporation: *See—*
Brunner, Hans-Georg, 4,995,902, Cl. 71-94.000.
Kristinsson, Haukur, 4,996,325, Cl. 548-132.000.
Kuhn, Martin; and Ouziel, Philippe, 4,996,348, Cl. 558-445.000.
Langfeld, Horst, 4,996,302, Cl. 534-582.000.
Leppard, David G.; Slongo, Mario; and Rody, Jean, 4,996,326, Cl. 548-261.000.
Morawietz, Hans, 4,995,885, Cl. 8-527.000.
Puntener, Alois; and Parisot, Daniel, 4,996,303, Cl. 534-602.000.
Sinnreich, Joel, 4,996,058, Cl. 424-462.000.
Tzikas, Athanasios, 4,996,304, Cl. 534-637.000.

Ciba Vision Corporation: *See—*
Kanner, Rowland W., 4,996,027, Cl. 422-113.000.

Cielo, Paolo G.; Maldague, Xavier; and Krapez, Jean C., to National Research Council of Canada. Device for subsurface flaw detection in reflective materials by thermal transfer imaging. 4,996,426, Cl. 250-330.000.

Ciraula, Michael K.; Durham, Christopher M.; and Jallice, Derwin L., to International Business Machines Corporation. Zero standby power, radiation hardened, memory redundancy circuit. 4,996,670, Cl. 365-200.000.

Claassen, Henning J., to Nordson Corporation. Apparatus for applying a thermoplastic high-polymer material, in particular an adhesive, to a substrate. 4,995,558, Cl. 239-226.000.

Clark, Michael G.: *See—*
Nicholas, Beatrice M.; Mosley, Alan; Hilsum, Cyril; and Clark, Michael G., 4,996,104, Cl. 428-323.000.

Clarke, David J.: *See—*
Wiles, Martin C.; Schiffrin, David J.; and Clarke, David J., 4,995,960, Cl. 204-418.000.

Classen, Theodore M.: *See—*
Hays, George E.; and Classen, Theodore M., 4,995,961, Cl. 208-108.000.

Cline, Harvey E.; and Hardy, Christopher J., to General Electric Company. Fast NMR cardiac profile imaging. 4,995,394, Cl. 128-653.00A.

Close, Gregg V. Fence post installation. 4,995,590, Cl. 256-24.000.

Cloutier, Robert P.: *See—*
Pagano, Daniel M.; and Cloutier, Robert P., 4,996,546, Cl. 354-76.000.

CMI Corporations: *See—*
Smith, Don W., 4,995,758, Cl. 404-88.000.

Cobb, William. Wall connector device. 4,995,209, Cl. 52-238.100.

Cocco, Vincent L.; and Grimes, Donald L., to Polaroid Corporation. Integral card for protectively enclosing an optical disk and a visual information bearing area. 4,996,681, Cl. 369-273.000.

Cochran, Robert N.: *See—*
Lin, Shaw-Chan; and Cochran, Robert N., 4,996,374, Cl. 568-814.000.

Codkind, Doris. Protective glove or glove liners. 4,995,119, Cl. 2-163.000.

Coe, Charles G.: *See—*
Pierantozzi, Ronald; Miller, Mildred A.; Listemann, Mark L.; Gaffney, Thomas R.; and Coe, Charles G., 4,996,322, Cl. 564-216.000.

Coes, Cecil. Femoral elevating tool. 4,995,875, Cl. 606-90.000.

Coffey, Donald R. Water skier's safety system. 4,995,841, Cl. 441-11.000.

Cogema Compagnie Generale des Matieres Nucleaires: *See—*
Catalayoud, Louis; and Gerard, Michel, 4,996,019, Cl. 376-272.000.

Cohen, Allen L. Multifocal optical device with novel phase zone plate and method for making. 4,995,714, Cl. 351-161.000.

Cohen, Allen L. Diffractive multifocal optical device. 4,995,715, Cl. 351-161.000.

Cohen, Irun R.; and Shinitzky, Meir, to Yeda Research and Development Co. Ltd. Pressure treated autoimmune specific T cell compositions. 4,996,194, Cl. 514-21.000.

Cohen, Martin P.: *See—*
Pyke, James B.; Bauer, Richard G.; Cohen, Martin P.; and Handa, Pawan K., 4,996,263, Cl. 525-178.000.

Cohn, Robert. Continuous web splicing machine. 4,995,936, Cl. 156-504.000.

Cole, Theodore J.; and Swartzendruber, Ray E., to CTB, Inc. Feeder apparatus. 4,995,343, Cl. 119-53.000.

Coleman Outdoor Products, Inc.: *See*—
Bamber, David J., 4,995,154, Cl. 30-147.000.

Coleman, Robert L., to GTE Valenite Corporation. Insert cutter. 4,995,766, Cl. 407-34.000.

Colin Electronisc Co., Ltd.: *See*—
Hayashi, Ressei; and Hayakawa, Tokuji, 4,995,399, Cl. 128-680.000.

Colin, Laurence; and Spehar, Edward R. Unit dosage dispenser for dental impression materials. 4,995,540, Cl. 222-132.000.

Collie, Russell, to Boudreau and Collie. Inflatable warning sign. 4,995,186, Cl. 40-591.000.

Colonias, Karen W.; Commins, Alfred D.; Gilb, Tyrell T.; Lin, Jin-Jie; and Moore, Richard D., to Simpson Strong-Tie Company, Inc. Elevated post base. 4,995,206, Cl. 52-297.000.

Colpaert, James J.: *See*—
Temple, Robert B.; and Colpaert, James J., 4,995,481, Cl. 188-70.00R.

Comardo, Mathis P. Collapsible trailer/ramp assembly. 4,995,129, Cl. 14-71.100.

Combustion Engineering, Inc.: *See*—
Bryan, William J., 4,996,021, Cl. 376-446.000.

Commandeur, Raymond; and Ghenassia, Elie, to Atochem. Preparation of arylsulfonyl (alkyl) amides. 4,996,360, Cl. 564-90.000.

Commins, Alfred D.: *See*—
Colonias, Karen W.; Commins, Alfred D.; Gilb, Tyrell T.; Lin, Jin-Jie; and Moore, Richard D., 4,995,206, Cl. 52-297.000.

Commissariat a. l'Energie Atomique: *See*—
Moussavi, Mehdi; and Secourgeon, Liliane, 4,996,311, Cl. 540-139.000.

Conger, Jeffrey S.: *See*—
Peczalski, Andrezj; Costa, Julio C.; and Conger, Jeffrey S., 4,996,454, Cl. 307-480.000.

Conlab Inc.: *See*—
Conville, David J., 4,995,605, Cl. 52-770.000.

Conlan, John T.: *See*—
Whitekettle, Wilson K.; and Conlan, John T., 4,995,987, Cl. 210-754.000.

Connell, Lawrence E., to Motorola, Inc. Auto-zeroing circuit for offset cancellation. 4,996,529, Cl. 341-118.000.

Conners, Patrick J.; Stevens, Lawrence R.; Gaiser, Don R.; and Pennypacker, Frank C., to Guardian Technologies, Inc. Breath alcohol testing system. 4,996,161, Cl. 436-132.000.

Connery, Daniel P.; Bacon, D. Dexter; and Blair, Stacy K. Technique for stabilizing building foundations. 4,995,764, Cl. 405-229.000.

Connolly, Timothy J.: *See*—
Siegel, Jodie M.; Sternlieb, Herschel; Connolly, Timothy J.; Greenway, J. Michael; Parker, D. A.; and Simon, Arlene T., 4,995,151, Cl. 26-69.00R.

Conoco Inc.: *See*—
Beck, Jeffrey L.; and Taylor, Larry D., 4,995,465, Cl. 175-27.000.

Conoco Specialty Products Inc.: *See*—
Carroll, Noel; and Kalnins, Charles M., 4,995,989, Cl. 210-788.000.

Constantine, Margaret J.; and Krysztal, Stanislaw, to Constantine & Weir Ltd. Solid shampoo composition in compact needle form with water as a binder. 4,996,006, Cl. 252-550.000.

Constantine & Weir Ltd.: *See*—
Constantine, Margaret J.; and Krysztal, Stanislaw, 4,996,006, Cl. 252-550.000.

Continental Coach Ltd.: *See*—
Buday, John M., 4,995,664, Cl. 296-165.000.

Contois, Lawrence E.: *See*—
Buettner, Albert V.; Bucks, Rodney R.; and Contois, Lawrence E., 4,996,124, Cl. 430-59.000.

Conville, David J., to Conlab Inc. Panel fastener clip and method of panel assembly. 4,995,605, Cl. 52-770.000.

Cook, John E., to Siemens-Bendix Automotive Electronics Limited. Regulated flow canister purge system. 4,995,369, Cl. 123-520.000.

Cook, William A.; Fearnot, Neal E.; and Geddes, Leslie A., to Purdue Research Foundation. Exercise responsive cardiac pacemaker. 4,995,390, Cl. 128-419.0PG.

Cooke, Richard C.: *See*—
Johnson, Calvin K.; Cooke, Richard C.; and Tse, Kwok-Tuen, 4,996,249, Cl. 523-144.000.

Cooke, William M.; Hendrix, James E.; and Tolbert, Thomas W., to Springs Industries, Inc. Fire-resistant fabric. 4,996,099, Cl. 428-245.000.

Cookson Company, The: *See*—
Wardlaw, Russell, 4,995,651, Cl. 292-201.000.

Cooper Industries, Inc.: *See*—
Dodd, Peter G.; and Harrison, Franklyn, 4,996,464, Cl. 315-289.000.
Garbett, Keith, 4,995,458, Cl. 166-85.000.

Cooper, James L.; and San Soucie, Marc D., to Wang Laboratories, Inc. Method for generating document using tables storing pointers and indexes. 4,996,662, Cl. 364-900.000.

Cooper, Judith: *See*—
Spier, I. Martin, 4,995,173, Cl. 36-29.000.

Cooper, Leonard: *See*—
Spier, I. Martin, 4,995,173, Cl. 36-29.000.

Copeland, James C.; Adler, Howard I.; and Crow, Weldon D., to Oxyrase, Inc. Method and composition for removing oxygen from solutions containing alcohols and/or acids. 4,996,073, Cl. 426-487.000.

Corcoran, Dan E. Prisoner restraint system. 4,995,672, Cl. 297-483.000.

Cornell Research Foundation, Inc.: *See*—
Smith, Victoria L.; Wilcox, Wayne F.; and Harman, Gary E., 4,996,157, Cl. 435-254.000.

Cornette, Holley M.; and Weingarten, Jean M. S., to Atlantic Richfield Company. Gravel pack well completions. 4,995,456, Cl. 166-51.000.

Corning Incorporated: *See*—
Beall, George H.; Dickinson, James E., Jr.; and Quinn, Candace J., 4,996,172, Cl. 501-45.000.

Cortese, Richard: *See*—
Eckenhoff, James B.; Magruder, Judy A.; Cortese, Richard; Peery, John R.; and Wright, Jeremy C., 4,996,060, Cl. 424-473.000.

Corveler, Yvon: *See*—
Champalaune, Jean-Claude; Corveler, Yvon; and Coutard, Andre , 4,995,803, Cl. 425-190.000.

Cosart, Lee D., III: *See*—
Tambe, Atul; Chu, David; and Cosart, Lee D., III, 4,996,474, Cl. 324-78.00D.

Costa, Julio C.: *See*—
Peczalski, Andrezj; Costa, Julio C.; and Conger, Jeffrey S., 4,996,454, Cl. 307-480.000.

Cotsman, David N.; Kovach, John; Zuccaro, Dante C.; and Kudwa, Frank J., to General Motors Corporation. Robot tool changer and overload device. 4,995,493, Cl. 192-150.000.

Coucoulas, Alexander: *See*—
Arvikar, Ram J.; Benko, John W.; Coucoulas, Alexander; and Wojcik, Thaddeus, 4,995,149, Cl. 29-25.350.

Couper, William D.; and Michael, George W., to AMP Incorporated. Precision test connector. 4,995,837, Cl. 439-863.000.

Cousins, Russell D.; Frazee, James S.; Gleason, John G.; and Hall, Ralph F., to SmithKline Beecham Corporation. Quinolinyl substituted phenyl/thioalkanoic acid substituted propionic acids and leucotriene antagonist use thereof. 4,996,214, Cl. 514-311.000.

Coutard, Andre : *See*—
Champalaune, Jean-Claude; Corveler, Yvon; and Coutard, Andre , 4,995,803, Cl. 425-190.000.

Cowley, Trent E., to Atlantic Richfield Company. Rapid shut-off system for a truck engine. 4,995,355, Cl. 123-198.0DB.

Cox, Brian: *See*—
Rees, John M. H.; Robinson, Brian; and Cox, Brian, 4,996,223, Cl. 514-410.000.

Cox, Roger G.; Yeager, Michael W.; and Flake, Lance L., to United Technologies Corporation. Single chip complex floating point numeric processor. 4,996,661, Cl. 364-748.000.

Coyle, Catherine L.; Greaney, Mark A.; Stiefel, Edward I.; Francis, James N.; and Beltzer, Morton, to Exxon Research and Engineering Company. Molybdenum sulfur antiwear and antioxidant lube additives. 4,995,996, Cl. 252-42.700.

Craft, Ralph. Rapid change drill holder assembly. 4,995,768, Cl. 408-239.00A.

Craig, Andrew J. M., to Flavourtech Pty. Ltd. Counter-current gas-liquid contacting device. 4,995,945, Cl. 202-177.000.

Crane, Jack W., to Ford New Holland, Inc. Bag rupturing mechanism for waste material debagging apparatus. 4,995,770, Cl. 414-412.000.

Crawford, A. Gerrit: *See*—
Norlien, John A.; Huhn, James M.; and Crawford, A. Gerrit, 4,995,256, Cl. 73-31.040.

Crawford Fitting Company: *See*—
Johnston, Lonnie E.; and Homan, Peter C., 4,995,646, Cl. 285-137.100.

Crescentini, Lamberto: *See*—
Fisher, William B.; Crescentini, Lamberto; and Balint, Laszlo J., 4,996,036, Cl. 423-388.000.

Crestey, Pierre: *See*—
Rouquier, Pierre; Pele, Michel; Ic, Andre ; and Crestey, Pierre, 4,995,236, Cl. 62-51.100.

Crihfield, Michael W. Rattling fish lure. 4,995,189, Cl. 43-42.310.

Critchlow, David N.; Avis, Graham M.; Earlam, Sandra J. K.; Johnson, Karle J.; Smetana, Bruce A.; Westling, Gregory L.; Paneth, Eric; and Yehushua, Moshe, to International Mobile Machines Corporation. Deglitching means for digital communication systems. 4,996,697, Cl. 375-104.000.

Croft, George, to Canadian A.S.E. Limited. Adjustable latching device with memory feature for vehicle seat assemblies. 4,995,669, Cl. 297-379.000.

Crossway, Anne; and Houck, Catherine M., to Calgene, Inc. Microassay for detection of DNA and RNA. 4,996,144, Cl. 435-6.000.

Croudace, Gordon R., to Croudace Holdings Pty Ltd. Storage terminal vapor emission control system. 4,995,890, Cl. 55-180.000.

Croudace Holdings Pty Ltd.: *See*—
Croudace, Gordon R., 4,995,890, Cl. 55-180.000.

Crow, Weldon D.: *See*—
Copeland, James C.; Adler, Howard I.; and Crow, Weldon D., 4,996,073, Cl. 426-487.000.

Crozat, Georges: *See*—
Martin, Frederic; and Crozat, Georges, 4,996,029, Cl. 422-188.000.

Crumb, Donald A.; Zander, Richard A.; and Gaiser, Robert F., to Allied-Signal Inc. Positioning ring for a hydraulically operated warning device. 4,995,676, Cl. 303-9.630.

CTB, Inc.: *See*—
Cole, Theodore J.; and Swartzendruber, Ray E., 4,995,343, Cl. 119-53.000.

Culhane, Thomas D.: *See*—
Kringen, Dale E.; and Culhane, Thomas D., 4,996,517, Cl. 340-506.000.

Cullen, William R.; Fryzuk, Michael D.; James, Brian R.; Kang, Guo-Jun; Kutney, James P.; Spogliarich, Roberto; and Thorburn, Ian S.,

to University of British Columbia, The. Process for the preparation of optically active secondary arylamines. 4,996,361, Cl. 564-304.000.

Cullo, Leonard A.; and Shiring, Francis J., III, to Aristech Chemical Corporation. Use of silica-titania hydrocarbon conversion catalyst in hydrocarbon conversion processes. 4,996,385, Cl. 585-640.000.

Cummings, John G., to Indak Manufacturing Corp. Push button vacuum-electric air control device for automotive vehicles. 4,996,394, Cl. 200-5.00E.

Cunningham, Paul A.; and Grise, Frederick G. J. Electrical heater and plug. 4,995,835, Cl. 439-668.000.

Curado, Len: *See*—
Beckman, Ralph A.; Sharpe, Henry D., III; Curado, Len; and Barfoot, James W., 4,995,403, Cl. 128-776.000.

Curto, Caterino; and Longo, Gianantonio, to F.A.O.M.S. Spectacle frame. 4,995,713, Cl. 351-113.000.

Cuscurida, Michael; Su, Wei-Yang; and Speranza, George P., to Texaco Chemical Company. Preparation of aminotetramines. 4,996,294, Cl. 528-421.000.

Cytocolor, Inc.: *See*—
Kass, Lawrence, 4,996,040, Cl. 424-3.000.

Czauderna, Bernhard; Nieberle, Juergen; Peter, Roland; and Nissen, Dietmar, to BASF Aktiengesellschaft. Vinyl ester resins. 4,996,270, Cl. 525-531.000.

Czempik, Klaus: *See*—
Hinrichs, Michael; Homolla, Jurgen; Schormair, Eckart; Czempik, Klaus; and Hornig, Rolf, 4,995,342, Cl. 119-18.000.

Dack, David G.; Huckett, Eric P.; and Macintosh, David W., to Hewlett-Packard. Arrangement for accessing and testing telecommunication circuits. 4,996,695, Cl. 375-10.000.

Dagustany, Amer; Spriestersbach, Jochen; Gunther, Bernd; and Knall, Gerhard, to Bayerische Motoren Werke Aktiengesellschaft. Manufacturing process for die-cast light-metal wheels of passenger cars. 4,995,917, Cl. 148-3.000.

Dahlberg, Kurt R., to Campbell Soup Company. Novel interspecific mushroom strains. 4,996,390, Cl. 800-220.000.

Dai-Ichi Kogyo Seiyaku Co., Ltd.: *See*—
Matsumoto, Shusaku; Hatakawa, Yoshio; and Nakajima, Akihiko, 4,995,911, Cl. 127-48.000.
Matsumoto, Shusaku; Hatakawa, Yoshio; and Nakajima, Akihiko, 4,996,309, Cl. 536-119.000.

Daicel Chemical Industries, Ltd.: *See*—
Kojima, Hidetaka; and Fujiwa, Takaaki, 4,996,357, Cl. 562-607.000.

Daiku, Yoshiharu: *See*—
Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, 4,996,215, Cl. 514-316.000.

Daimler-Benz AG: *See*—
Kadel, Karl, 4,995,484, Cl. 188-218.00R.
Weidmann, Werner; and Tiefenbacher, Rainer, 4,995,447, Cl. 165-44.000.

Daimler, Berthold, to Carl Freudenberg, Firma. Extendable cylinders of elastically variable length for use in a pump. 4,995,304, Cl. 92-92.000.

Dainippon Plastics Co., Ltd.: *See*—
Kisima, Yoshio; Iwanaga, Teruo; and Goto, Hitoshi, 4,995,273, Cl. 73-865.600.

Dainippon Screen Mfg. Co., Ltd.: *See*—
Nanri, Seiji; Ueno, Masatoshi; and Ohno, Takashi, 4,996,560, Cl. 355-91.000.
Taniguchi, Yoshihiro; and Hashimoto, Hideaki, 4,996,605, Cl. 358-474.000.

Daiwa Seiko, Inc.: *See*—
Kawai, Michiki, 4,995,571, Cl. 242-249.000.

Dallas Semiconductor: *See*—
Zanders, Gary V.; and Lee, Robert D., 4,996,453, Cl. 307-475.000.

Damato, Bertil E., to University of Glasgow, The University Court of the. Device for moving eye campimetry. 4,995,717, Cl. 351-224.000.

Dandapani, Balasubramaniam; and Bockris, John O'M. Electrolysis of water using hydrogen sulfide. 4,995,952, Cl. 204-129.000.

Daniels, Brian W., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in her Britannic Majesty's Government of the. Roll-independent magneto meter system. 4,995,165, Cl. 33-361.000.

Danielsen, Arvid M.; and Shaw, Donald F., to Exxon Research and Engineering Company. Trickle valve. 4,996,028, Cl. 422-147.000.

Dansdill, Terence J. Contoured journal bearing. 4,995,735, Cl. 384-276.000.

D'Antonio, Michael J.; Gibbs, Irving A.; Lane, Lawrence J.; and Lawson, Rodney A., to General Electric Company. Method and apparatus for monitoring an amplifier. 4,996,519, Cl. 340-653.000.

Dapp, Timothy L.: *See*—
Lebovits, Alexander; Yaeger, William L.; Mercer, William B.; and Dapp, Timothy L., 4,996,261, Cl. 525-131.000.

Daraktchiev, Ivan S., to Olin Hunt Specialty Products Inc. Process for coating a photoresist composition onto a substrate. 4,996,080, Cl. 427-57.000.

Darrow, David S., to Dexter Corporation, The. Abrasion-resistant coating. 4,996,114, Cl. 428-610.000.

da Silva, Domingos, to Fabriques de Tabac Reunies, S.A. Apparatus and method for opening a reel of paper stripping. 4,995,406, Cl. 131-105.000.

Da Silva, Evelyne: *See*—
Malbe, Serge; Da Silva, Evelyne; and Fouche, Alain, 4,996,588, Cl. 357-80.000.

Data Exchange Corporation: *See*—
Widney, Douglas F., 4,996,608, Cl. 360-51.000.

DataCard Corporation: *See*—
Lundstrom, Robert W.; Sannel, Benjamin H.; and Warwick, Dennis J., 4,995,501, Cl. 198-341.000.

Datatape Incorporated: *See*—
Martija, Henry M., 4,995,570, Cl. 242-193.000.

Davey, Nigel M.; and Ferrier, Gordon G., to Johnson Matthey Public Limited Company. Silver-filled glass. 4,996,171, Cl. 501-19.000.

David, Lawrence D., to International Business Machines Corporation. Effective near neutral pH etching solution for molybdenum or tungsten. 4,995,942, Cl. 156-642.000.

David Sarnoff Research Center, Inc.: *See*—
Ipri, Alfred C.; and Napoli, Louis S., 4,996,575, Cl. 357-23.700.

Davis, Dennis W.; and Davis, Russell D. Optical transceiver system. 4,995,616, Cl. 273-312.000.

Davis, Gary C.; and Lewis, Larry N., to General Electric Company. Flame retardant, halogen free aromatic polycarbonate copolymer blends. 4,996,255, Cl. 524-261.000.

Davis, James L.; Pennisi, Robert W.; Nounou, Fadia; and Landreth, Bobby D., to Motorola, Inc. Solder pastes using alcohol blends as rheological aids. 4,995,921, Cl. 148-22.000.

Davis, James N. Combined root barrier and watering collar arrangement. 4,995,191, Cl. 47-25.000.

Davis, Larry: *See*—
Effland, Richard C.; Davis, Larry; Kapples, Kevin J.; and Olsen, Gordon E., 4,996,205, Cl. 514-250.000.

Davis, Melvin D.: *See*—
Jacquot, William E.; Tettman, Richard L.; and Davis, Melvin D., 4,995,975, Cl. 210-266.000.

Davis, Russell D.: *See*—
Davis, Dennis W.; and Davis, Russell D., 4,995,616, Cl. 273-312.000.

Day, Jong-Yih. Garbage container. 4,996,467, Cl. 318-480.000.

De La Cruz, Richard: *See*—
Parente, Richard E.; De La Cruz, Richard; and Helmstetter, Richard C., 4,995,609, Cl. 273-80.200.

De La Fuente, Carlos, to Freyssinet International (STUP). Devices for damping the vibrations of stay cables. 4,995,583, Cl. 248-636.000.

Dearborn Chemical Company Ltd.: *See*—
Aston, David A.; and Paul, Stewart N., 4,995,944, Cl. 162-199.000.

Deason, Vance A.; Johnson, John A.; and Telschow, Kenneth L., to United States of America, Energy. Nondestructive material characterization. 4,995,260, Cl. 73-632.000.

DeBell, George C.: *See*—
Allor, Richard L.; Herman, John A., Sr.; and DeBell, George C., 4,995,281, Cl. 74-559.000.

DeBerry, Blake T.: *See*—
Watkins, Bruce J.; and DeBerry, Blake T., 4,995,464, Cl. 166-382.000.

Deemer, Mary M.; and Kugler, Lois K. Animal entrance. 4,995,336, Cl. 119-15.000.

Deepsea Power & Light, Inc.: *See*—
Olsson, Mark S.; Parker, Samuel B.; and Rimer, Douglas G., 4,996,635, Cl. 362-267.000.

Degnan, Thomas F., Jr.; and Landis, Michael E., to Mobil Oil Corporation. Wax hydroisomerization process. 4,995,962, Cl. 208-110.000.

de Hey, Johannes T.; Renes, Harrie; and Visser, Jan, to Unilever Patent Holdings B.V. Process for the preparation of flavor and fragrance materials. 4,996,069, Cl. 426-248.000.

Del Monte Corporation: *See*—
Nafisi-Movaghar, Karim, 4,996,070, Cl. 426-330.500.

Delancey, John M., Sr.: *See*—
Denney, Michael L.; Withrow, Shelby M.; and Delancey, John M., Sr., 4,995,896, Cl. 65-260.000.

DeLange, Robert J.; and Merrison, John C., to Allen-Bradley Company, Inc. Electric motor controller with bypass contactor. 4,996,469, Cl. 318-757.000.

Delau, William D.; Garman, James; and Keith, Kevin, to Welbilt Corporation. Cooking apparatus. 4,995,313, Cl. 99-467.000.

Delco Electronics Corporation: *See*—
Zarabadi, Seyed R.; and Pham, Linh N., 4,996,499, Cl. 330-264.000.

DellaPolla, Michael. Saw guide. 4,995,288, Cl. 83-574.000.

Delmas, Gilles: *See*—
Steers, Michel; Hazan, Jean-Pierre; and Delmas, Gilles, 4,995,244, Cl. 62-155.000.

DeLuca, Michael J., to Motorola, Inc. Power conservation method and apparatus for a portion of a synchronous information signal. 4,996,526, Cl. 340-825.440.

Demane, Michael; Fallin, Thomas W.; Garner, Steve; and Schryver, Jeff, to Smith & Nephew Richards Inc. Modular hip prosthesis. 4,995,883, Cl. 623-23.000.

Demizu, Akira: *See*—
Ohkubo, Satoru; and Demizu, Akira, 4,995,351, Cl. 123-90.110.

Demura, Toshiaki; and Tonoki, Ikuo, to NEC Home Electronics Ltd. Door operating mechanism. 4,995,143, Cl. 16-357.000.

Denney, Michael L.; Withrow, Shelby M.; and Delancey, John M., Sr., to Union Oil Company of California. Takeout jaws. 4,995,896, Cl. 65-260.000.

Dennison, Timothy D., to Leggett & Platt, Incoporated. Bedding box spring having snap-fit modular elements. 4,995,125, Cl. 5-247.000.

Denny, Patrick J.; and Wood, Peter, to Imperial Chemical Industries PLC. Agglomerate absorbents comprising copper and zinc useful for sulphur compounds removal. 4,996,181, Cl. 502-414.000.

Denz, Helmut; and Herden, Werner, to Robert Bosch GmbH. System for detecting engine ignition failures in an internal combustion engine. 4,995,365, Cl. 123-479.000.

Desjardins, Pierre; Trudel, Paul;; and Leroux, Jean-Marc, to Frisco Bay Industries of Canada Limited. Computerized filing and retrieval system for signature and pictorial documentation. 4,996,714, Cl. 382-3.000.

DeSoto, Inc.: *See*—
Noren, Gerry K.; Krajewski, John J.; and Murphy, Edward J., 4,996,282, Cl. 528-75.000.

Destouet, Judy M.; Eichling, John O.; Gilula, Louis A.; Monsees, Barbara S.; and Young, Vernon L., to Washington University. Radiolucent breast implant. 4,995,882, Cl. 623-8.000.

Detector Systems, Inc.: *See*—
Potter, Thomas; and Seabury, Thomas, 4,996,716, Cl. 455-41.000.

Deutsche Voest-Alpine Industrieanlagenbau GmbH: *See*—
Hauk, Rolf, 4,995,904, Cl. 75-445.000.

Devoussoux, Serge; Marchiset, Michel; and Saxod, Michel, to Procal. Radial seal rings. 4,995,621, Cl. 277-37.000.

Dew, Jimmy S., to James River II, Inc. Coextruded matte film. 4,996,096, Cl. 428-216.000.

Dewhirst, Kenneth C., to Shell Oil Company. Disaymmetric polymer materials. 4,996,279, Cl. 528-27.000.

DeWid, Richard. Soil cover for potted on in-ground plants. 4,995,192, Cl. 47-30.000.

Dexter Corporation, The: *See*—
Darrow, David S., 4,996,114, Cl. 428-610.000.

Diaz, Carlos M.: *See*—
Eerkes, Thijs; Diaz, Carlos M.; and Bell, James A. E., 4,996,115, Cl. 428-614.000.

diBenedetto, Bernard: *See*—
Tustison, Randal W.; Montanari, Dennis; Varitimos, Thomas; and diBenedetto, Bernard, 4,995,684, Cl. 350-1.600.

Dickinson, James E., Jr.: *See*—
Beall, George H.; Dickinson, James E., Jr.; and Quinn, Candace J., 4,996,172, Cl. 501-45.000.

Didier-Werke AG: *See*—
Rothfuss, Hans; and Keutgen, Peter, 4,995,596, Cl. 266-281.000.

Diehl GmbH & Co.: *See*—
Bankel, Adolf; Strauss, Hans; and Kerk, Stephan, 4,995,317, Cl. 102-235.000.

Dietsche, Wolfram: *See*—
Koehler, Gernot; Schmidt-Thuemmes, Juergen; Hasenbein, Norbert; Schlemmer, Lothar; and Dietsche, Wolfram, 4,996,259, Cl. 524-276.000.

Dietzler, Daniel P. Handling method for delivering baled solid waste to a balefill. 4,995,780, Cl. 414-400.000.

DiGirolamo, Joel A.: *See*—
Christiansen, Robert A.; and DiGirolamo, Joel A., 4,996,629, Cl. 361-400.000.

Digital Equipment Corporation: *See*—
Hamburgen, William R., 4,995,451, Cl. 165-104.330.

Diliello, Laura K.; Miller, Gregory D.; and Steele, Robert E., to General Motors Corporation. Fiber optic star coupler. 4,995,692, Cl. 350-96.160.

Dill, Donald S.: *See*—
Kaplan, Samuel S.; and Dill, Donald S., 4,995,300, Cl. 82-12.000.

Dines, Elsaine, legal representative: *See*—
Schramm, Charles M.; Lane, Robert H.; and Dines, Martin B., deceased, 4,995,897, Cl. 71-64.110.

Dines, Martin B., deceased: *See*—
Schramm, Charles M.; Lane, Robert H.; and Dines, Martin B., deceased, 4,995,897, Cl. 71-64.110.

di Palma, Giorgio: *See*—
Bartholomew, Victor L.; and di Palma, Giorgio, 4,995,864, Cl. 604-153.000.

Divigalpitiya, W. M. Ranjith; Frindt, Robert F.; and Morrison, S. Roy, to Simon Fraser University. Sheets of transition metal dichalcogenides. 4,996,108, Cl. 428-411.100.

Diwell, Alan F.; Hallett, Christopher; Ansell, Graham; and Hayes, John W., to Johnson Matthey Public Limited Company. Catalyst of copper oxide and ceria. 4,996,180, Cl. 502-304.000.

Dixit, Sunit S.: *See*—
Lazarus, Richard M.; Reardon, Edward J.; and Dixit, Sunit S., 4,996,122, Cl. 430-17.000.

Do-Thoi, Tha; and Popp, Klaus, to Hoechst CeramTec Aktiengesellschaft. Process for the production of a solder coating on metallized materials. 4,996,111, Cl. 428-432.000.

Dodd, Peter G.; and Harrison, Franklyn, to Cooper Industries, Inc. Ignitor disabler. 4,996,464, Cl. 315-289.000.

Doeuvne, Jean P.; and Mascarin, Guy, to French State represented by the Minister of Post, Telecommunications and Space. Automatic apparatus for controlling the size of wafer-supporting boats. 4,996,436, Cl. 250-560.000.

Dohi, Osamu: *See*—
Fujiwara, Michio; Matsumaru, Hiroshi; Kobayashi, Yasushi; Sakai, Yoshio; Yoneda, Kenzi; Dohi, Osamu; and Noguchi, Akihiko, 4,995,479, Cl. 187-135.000.

Dolden, Victor W.: *See*—
Ficken, Geoffrey E.; Edwards, Douglas J.; Mowforth, Clive W.; Maternaghan, Trevor J.; Steiger, Rolf; and Dolden, Victor W., 4,996,141, Cl. 430-583.000.

Donnelly Corporation: *See*—
Moser, Frank H.; and Lynam, Niall R., 4,996,083, Cl. 427-108.000.

Doolin, Lawrence E.; Gale, Richard M.; Godfrey, Otis W.; Hamill, Robert L.; Mahoney, David F.; and Yao, Raymond C., to Eli Lilly and Company. A80407 antibiotics. 4,996,148, Cl. 435-119.000.

Dougherty, John J., Jr.: *See*—
Whitman, Charles R.; and Dougherty, John J., Jr., 4,995,222, Cl. 53-510.000.

Dougherty, Robert R. Intraocular lens with unitary drawn haptics. 4,995,879, Cl. 623-6.000.

Doussain, Claude; Gubelmann, Michel; and Popa, Jean-Michel, to Rhone-Poulenc Chimie. Preparation of dinitrotoluenes. 4,996,376, Cl. 568-934.000.

Douwe Egberts Koninklijke Tabaksfabriek-Koffiebranderijen-Theehandel N.V.: *See*—
van der Lijn, Joost; and Van Thoor, Bernardus M., 4,995,310, Cl. 99-295.000.

Dow Chemical Company, The: *See*—
Bowman, Robert G.; Molzahn, David C.; and Hartwell, George E., 4,996,363, Cl. 564-470.000.
Bruza, Kenneth J., 4,996,288, Cl. 528-220.000.
Gardner, Jeffrey G.; and Gulau, Dennis J., 4,995,202, Cl. 51-439.000.
Hausman Hazlitt, Andrea J.; and Richey, Warren F., 4,996,160, Cl. 436-2.000.
Lee, Guo-shuh J.; Burdett, Kenneth A.; and Maj, Joseph J., 4,996,353, Cl. 562-412.000.
Lin, Chung Y., 4,996,242, Cl. 521-131.000.
Nafziger, John L.; and Hazelrigg, Mark J., 4,996,351, Cl. 560-352.000.
Olken, Michael M.; Lee, Guo-shuh J.; and Garces, Juan M., 4,996,388, Cl. 585-828.000.
Pews, R. Garth, 4,996,323, Cl. 546-250.000.
Sewell, Charles A.; and Toles, Robert D., 4,995,915, Cl. 134-22.140.
So, Ying H., 4,996,281, Cl. 528-73.000.

Downing Displays, Inc.: *See*—
Malott, John S., 4,995,211, Cl. 52-582.000.

Dowty Rotol Limited: *See*—
Hatton, John J., 4,995,597, Cl. 267-64.150.

Dravo Lime Company: *See*—
Stowe, Donald H., Jr.; and Benson, Lewis B., 4,996,032, Cl. 423-242.000.

Drawert, Manfred: *See*—
Bolze, Manfred; and Drawert, Manfred, 4,996,290, Cl. 528-272.000.

Drecker, Frank, to Grote & Hartmann GmbH & Co. KG. Round plug casing for electrical plugging contacts. 4,995,833, Cl. 439-596.000.

Dresser Industries, Inc.: *See*—
Zias, Arthur R.; Block, Barry; Mapes, Kenneth W.; Nystrom, Norman L.; and Cadwell, Robert M., 4,996,627, Cl. 361-283.000.

Dril-Quip, Inc.: *See*—
Watkins, Bruce J.; and DeBerry, Blake T., 4,995,464, Cl. 166-382.000.

Droste, Timothy A.; Middione, Jerome J.; and Kher, Himat B., to Ford Motor Company. Dual purpose automatic transmission oil pan. 4,995,971, Cl. 210-168.000.

Druckman, N. Ronald. Fabric of mixed yarns. 4,996,100, Cl. 428-259.000.

Druyvesteyn, Willem F.: *See*—
Ruigrok, Jacobus J. M.; Zieren, Victor; Enz, Ulrich E.; and Druyvesteyn, Willem F., 4,996,621, Cl. 360-126.000.

Dubost, Bruno: *See*—
Faure, Jean-Francois; and Dubost, Bruno, 4,995,920, Cl. 148-12.70A.

DuBost, Dominique, to Rapid S.A. Ornamental wheel hub cap. 4,995,673, Cl. 301-37.00P.

Duelfer, Timothy; and Blythin, David J., to Schering Corporation. Antiinflammatory and anti-hyperproliferative compounds. 4,996,212, Cl. 514-293.000.

Duffield, David J., to RCA Licensing Corporation. User programmable switching arrangement. 4,996,597, Cl. 358-181.000.

Dufournet, Denis; and Perret, Michel, to GEC Alsthom SA. Medium tension circuit breaking having high nominal current. 4,996,398, Cl. 200-148.00A.

Dufournet, Denis: *See*—
Thuries, Edmond; Dufournet, Denis; and Perret, Michel, 4,996,399, Cl. 200-148.00A.

Duluk, Jerome F., Jr. Content-addressable memory system capable of fully parallel magnitude comparisons. 4,996,666, Cl. 365-49.000.

Dumont, Willy: *See*—
Krief, Alain; and Dumont, Willy, 4,996,349, Cl. 560-124.000.

Dunbar, Bonita S., to Zonagen, Inc. Recombinantly expressed rabbit zona pellucida polypeptides. 4,996,297, Cl. 530-395.000.

Dunlop Limited: *See*—
Ingham, Peter L., 4,995,598, Cl. 267-293.000.

Du Pont de Nemours, E. I., and Company: *See*—
Armstrong, Mark L.; and Mickish, Daniel J., 4,995,685, Cl. 350-3.650.
Bloom, Joy S., 4,996,287, Cl. 528-125.000.
Juers, Daniel F., 4,995,913, Cl. 134-13.000.
Perusich, Stephen A.; and Keating, James T., 4,996,098, Cl. 428-229.000.
Putzig, Donald E.; and Smeltz, Kenneth C., 4,996,336, Cl. 556-55.000.
Rorer, Morris P., 4,995,901, Cl. 71-93.000.
Smothers, Willaim K.; Monroe, Bruce M.; and Chan, Dominic M., 4,996,120, Cl. 430-2.000.

Durham, Christopher M.: *See—*
Ciraula, Michael K.; Durham, Christopher M.; and Jallice, Derwin L., 4,996,670, Cl. 365-200.000.
Duthie, Antony C., to Westland Helicopters, Ltd. Method for forming components from fibre-reinforced thermoplastic materials. 4,995,931, Cl. 156-212.000.
Dutt, William M., to Mobil Oil Corporation. One-sided cling/one-sided slip stretch wrap films. 4,996,094, Cl. 428-212.000.
Dutta, Tamal K.: *See—*
Chao, Kuo-Hua; Dutta, Tamal K.; and Slaugh, Lynn H., 4,996,007, Cl. 260-410.90R.
Dwivedi, Ratnesh K.: *See—*
Newkirk, Marc S.; Lesher, H. Daniel; Dwivedi, Ratnesh K.; and Kantner, Robert C., 4,996,176, Cl. 501-127.000.
Dworak, Gert: *See—*
Awad, Rami-Raimund; Dworak, Gert; Zuckert, Bertram; and Weger, Walter, 4,996,250, Cl. 523-500.000.
Dyer, Allan: *See—*
Dyer, Allan E.; and Savoia, Ernest, 4,995,378, Cl. 128-75.000.
Dyer, Allan E.; and Savoia, Ernest, to Dyer, Allan. Therapeutic table. 4,995,378, Cl. 128-75.000.
Eadie, Donald T.; and Fyles, Thomas M., to MacMillan Bloedel Limited. Membrane separation process. 4,995,983, Cl. 210-639.000.
Earl, Gordon C. Magnetic stem and vertically fixed pocket device for a stationary riveting machine. 4,995,543, Cl. 227-113.000.
Earlam, Sandra J. K.: *See—*
Critchlow, David N.; Avis, Graham M.; Earlam, Sandra J. K.; Johnson, Karle J.; Smetana, Bruce A.; Westling, Gregory L.; Paneth, Eric; and Yehushua, Moshe, 4,996,697, Cl. 375-104.000.
Easter, Richard: *See—*
Schultze, Eckart F.; Easter, Richard; and Funderburk, Robert V., 4,995,194, Cl. 49-32.000.
Eastman Kodak Company: *See—*
Bell, Cynthia S.; and Gaboury, Michael J., 4,996,523, Cl. 340-781.000.
Blanding, Douglass L., 4,996,563, Cl. 355-212.000.
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 4,996,003, Cl. 252-301.40F.
Buettner, Albert V.; Bucks, Rodney R.; and Contois, Lawrence E., 4,996,124, Cl. 430-59.000.
Pagano, Daniel M.; and Cloutier, Robert P., 4,996,546, Cl. 354-76.000.
Phan, Hieu D.; Carrier, Gary W.; Stockl, Rebecca R.; Tortorici, Frank J.; and Wulf, R. Gary, 4,996,252, Cl. 524-88.000.
Raynolds, Peter W.; and Bagrodia, Shriram, 4,996,107, Cl. 428-400.000.
Sarraf, Sanwal P., 4,995,689, Cl. 350-96.140.
Schappler, Joseph J.; Glogan, David J.; and Burnham, William L., 4,996,548, Cl. 354-149.110.
Easwaran, Jay, to Western Michigan University, The Board of Trustees of. Process for evaporative pattern casting. 4,995,443, Cl. 164-34.000.
Eaton Corporation: *See—*
Barthel, Richard C.; Malone, Peter J.; Orth, Charles D.; and Jarosch, George W., 4,995,240; Cl. 62-225.000.
Ebato, Ken; and Sato, Susumu, to NCR Corporation. Passbook page turning mechanism. 4,995,184, Cl. 40-531.000.
Ebel, Klaus: *See—*
Berbner, Heinz; Ebel, Klaus; Kuczaty, Michael; Seid, Bernhard; Woerner, Frank P.; and Zettler, Hans D., 4,996,289, Cl. 528-230.000.
Eberhardt, Kurt; and Nibrig, Reinhold, to Babcock-BSH Aktiengesellschaft, vormals Buttner-Schilde-Haas AG. Mixing device for mortar. 4,995,729, Cl. 366-2.000.
Eberhart, Edward. Sanding tool. 4,995,200, Cl. 51-358.000.
Echard, Terrance G.: *See—*
Ash, Stephen R.; and Echard, Terrance G., 4,995,268, Cl. 73-861.050.
Ecia-Equipements et Composants pour l'Industrie Automobile: *See—*
Ballet, Jean-Noel, 4,995,567, Cl. 242-107.000.
Eckenhoff, James B.; Magruder, Judy A.; Cortese, Richard; Peery, John R.; and Wright, Jeremy C., to ALZA Corporation. Device comprising liner for protecting fluid sensitive medicament. 4,996,060, Cl. 424-473.000.
Eckhaus, Ira. Electrical wire connectors. 4,995,830, Cl. 439-409.000.
Eduard Kusters Maschinenfabrik GmbH & Co. KG: *See—*
Ahrweiler, Karl-Heinz; and Funger, Bernhard, 4,995,147, Cl. 29-116.100.
Edwards, Douglas J.: *See—*
Ficken, Geoffrey E.; Edwards, Douglas J.; Mowforth, Clive W.; Maternaghan, Trevor J.; Steiger, Rolf; and Dolden, Victor W., 4,996,141, Cl. 430-583.000.
Edwards, Michael L.; McCarthy, James R.; and Prakash, Nellikunja J., to Merrell Dow Pharmaceuticals Inc. Derivatives with unsaturated substitutions for the 5'-hydroxymethyl group. 4,996,308, Cl. 536-26.000.
Eerkes, Thijs; Diaz, Carlos M.; and Bell, James A. E., to Inco Limited. Composite structure. 4,996,115, Cl. 428-614.000.
Efamol Limited: *See—*
Horrobin, David F., 4,996,233, Cl. 514-560.000.
EFFEM GmbH: *See—*
Hinrichs, Michael; Homolla, Jurgen; Schormair, Eckart; Czempik, Klaus; and Hornig, Rolf, 4,995,342, Cl. 119-18.000.
Effland, Richard C.; Davis, Larry; Kapples, Kevin J.; and Olsen, Gordon E., to Hoechst-Roussel Pharmaceuticals Inc. Composition and method of use of pyrido[3,4-f]pyrrolo[1,2-b][1,2,5]triazepines. 4,996,205, Cl. 514-250.000.
Eichenauer, Ulrich: *See—*
Neumann, Peter; and Eichenauer, Ulrich, 4,996,354, Cl. 562-424.000.
Eichling, John O.: *See—*
Destouet, Judy M.; Eichling, John O.; Gilula, Louis A.; Monsees, Barbara S.; and Young, Vernon L., 4,995,882, Cl. 623-8.000.
Eiden, Glenn E. Dual axis solar collector assembly. 4,995,377, Cl. 126-424.000.
Eisai Co., Ltd.: *See—*
Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, 4,996,215, Cl. 514-316.000.
Eisenbraun, Allan A.; and Blocker, Wesley C., to Ethyl Corporation. Production of electronic coatings by spin coating a partially fluorinated polyamic acid composition. 4,996,254, Cl. 524-104.000.
Electric Power Research Institute, Inc.: *See—*
Leon, Robert L., 4,995,257, Cl. 73-116.000.
Eli Lilly and Company: *See—*
Doolin, Lawrence E.; Gale, Richard M.; Godfrey, Otis W.; Hamill, Robert L.; Mahoney, David F.; and Yao, Raymond C., 4,996,148, Cl. 435-119.000.
Gapinski, D. Mark, 4,996,230, Cl. 514-454.000.
Moore, Richard E.; Furusawa, Eiichi; Norton, Ted R.; Patterson, Gregory M. L.; and Mynderse, Jon S., 4,996,229, Cl. 514-450.000.
Robertson, David W.; and Wong, David T., 4,996,235, Cl. 514-649.000.
Eling, Berend; and Tweedale, Colin R., to Imperial Chemical Industries PLC. Polyisocyanurate rigid foams. 4,996,241, Cl. 521-107.000.
Elkachouty, Ahmed A., to Pfizer Hospital Products Group, Inc. Colloidal silica water based slurry system for investment casting shell backup coats. 4,996,084, Cl. 427-133.000.
Ellestad, George A.: *See—*
McGahren, William J.; and Ellestad, George A., 4,996,305, Cl. 536-17.500.
Elliott, Arthur J.: *See—*
Berger, Joel G.; Chang, Wei K.; Gold, Elijah H.; and Elliott, Arthur J., 4,996,202, Cl. 514-213.000.
Ellis, Edward J.; and Ellis, Jeanne Y., to Polymer Technology Corporation. Fluorine containing polymeric compositions useful in contact lenses. 4,996,275, Cl. 526-245.000.
Ellis, Janice. Garment for a wheelchair occupant. 4,995,115, Cl. 2-69.000.
Ellis, Jeanne Y.: *See—*
Ellis, Edward J.; and Ellis, Jeanne Y., 4,996,275, Cl. 526-245.000.
Ellul, Joseph P.; and Tay, Sing P. Method of forming multiple nitride coating on silicon. 4,996,081, Cl. 427-96.000.
Elpatronic AG: *See—*
Alznauer, Kurt; Baumgartner, Michael; Boegli, Werner; and Brauer, Jurgen, 4,995,254, Cl. 72-342.100.
Elshansky, Petr V.: *See—*
Mikheev, Sergei M.; Zemerov, Valery N.; and Elshansky, Petr V., 4,995,267, Cl. 73-800.000.
Emerson Electric Co.: *See—*
Mak, Sioe T.; Maginnis, Richard L.; and Franzen, Kevin J., 4,996,513, Cl. 340-310.00R.
Emhart Industries, Inc.: *See—*
Baker, Russ J., 4,996,658, Cl. 364-571.040.
Hawkswell, Victor T., 4,995,662, Cl. 294-64.100.
Endo, Shinichi, to TDK Corporation. Ultrasonic atomizer circuit having plural oscillators. 4,996,502, Cl. 331-46.000.
Endo, Tatsuya: *See—*
Aoyagi, Akihiko; Endo, Tatsuya; and Terashima, Hiroshi, 4,996,616, Cl. 360-104.000.
Endo, Yukio: *See—*
Nishida, Yasuaki; Iino, Yoshiki; Ohtake, Hiroshi; Abe, Masahide; Yoshikawa, Shigeo; Endo, Yukio; Matsunaga, Yoshiyuki; and Harada, Nozomu, 4,996,600, Cl. 358-213.220.
Endoh, Tetsuo; Shirota, Riichiro; Momodomi, Masaki; Tanaka, Tomoharu; Masuoka, Fujio; and Watanabe, Shigeyoshi, to Kabushiki Kaisha Toshiba. Electrically erasable programmable read-only memory with NAND memory cell structure. 4,996,669, Cl. 365-185.000.
Endou, Osamu: *See—*
Suzuki, Seizoh; and Endou, Osamu, 4,995,710, Cl. 350-480.000.
Engelhardt, Gunther; Lohrmann, Gerhard; and Werner, Thomas, to Mannesmann Aktiengesellschaft. Paper stacking apparatus for office machines. 4,995,747, Cl. 400-625.000.
Englemann, Dirk. Surfboard. 4,995,843, Cl. 441-74.000.
Engsbraten, Bjorn, to Nitro Nobel AB. Blasting composition. 4,995,925, Cl. 149-2.000.
Enichem Synthesis S.p.A.: *See—*
Greco, Alberto; Giordano, Sergio; Pozzi, Enrico; and Blasioli, Patrizia, 4,996,283, Cl. 528-80.000.
Eniricerche S.p.A: *See—*
Tinucci, Laura; and Platone, Edoardo, 4,996,366, Cl. 568-454.000.
Enoki, Yasutaka; Makino, Shigeo; and Murase, Shinji, to Bridgestone Corporation. Heavy duty pneumatic radial tires including a bent groove in the side face of the tread. 4,995,437, Cl. 152-209.00R.
Enomoto, Shigeo; and Odano, Taminori, to Asahi Kogaku Kogyo Kabushiki Kaisha. Apparatus for correcting blurred image of camera using angular acceleration sensor and angular acceleration sensor. 4,996,545, Cl. 354-70.000.
Ensign-Bickford Optics Company: *See—*
Purcell, Earl E., Jr., 4,995,691, Cl. 350-96.150.

Entenmann, John K.; Hooke, John A.; Kampmeier, Eric E.; and Posterick, Barry L., to AT&T Bell Laboratories. Use of telecommunications systems for lotteries. 4,996,705, Cl. 379-91.000.
Enyo, Hiroji; Iwanaga, Shin-ichiro; and Takemura, Yasuhiko, to Japan Synthetic Rubber Co., Ltd. Conjugated diene copolymer, a process for producing the copolymer, and a photosensitive composition comprising the copolymer. 4,996,134, Cl. 430-286.000.
Enz, Ulrich E.: *See*—
Ruigrok, Jacobus J. M.; Zieren, Victor; Enz, Ulrich E.; and Druyvesteyn, Willem F., 4,996,621, Cl. 360-126.000.
Equalizer Tools, Inc.: *See*—
Asbery, Ray, 4,995,153, Cl. 30-116.000.
Equus Scientific Labs, Inc., West Coast Office: *See*—
Adamich-Saltman, Marina, 4,996,043, Cl. 424-61.000.
Erdelyi, Katalin: *See*—
Ferenczi, Gyorgy; Erdelyi, Katalin; Somogyi, Maria; Boda, Janos; Fule, Gyorgy; and Aszodi, Gabor, 4,995,939, Cl. 156-627.000.
Ergenics, Inc.: *See*—
Sandrock, Gary D.; and Woodard, Winfred L., III, 4,996,002, Cl. 252-181.600.
Erlbruch, Peter, to Mannesman Aktiengesellschaft. Mechanical shiftable three speed planetary transmission. 4,995,861, Cl. 475-298.000.
Ernst, Andreas B.; and Caspari, Gunter, to Amoco Corporation. Process for making 4,4'-dihydroxydiphenyl sulfone. 4,996,367, Cl. 568-33.000.
Erpelding, A. David; Palmer, Darrell D.; and Wilmer, Richard K., to International Business Machines Corporation. Laminated suspension for a negative pressure slider in a data recording disk file. 4,996,623, Cl. 360-104.000.
Ertle, Raymond T.; and Arbaugh, Robert P., to Capital City Products Company. Puffed borax as an agglomerating aid. 4,996,001, Cl. 252-99.000.
Eryman, William S.: *See*—
Haddad, Muin S.; Meyers, Bernard L.; and Eryman, William S., 4,996,179, Cl. 502-209.000.
Esco Corporation: *See*—
Briscoe, Terry L.; and Sprunger, Paul C., 4,995,176, Cl. 37-141.00R.
Eshghy, Siavash, to Allen-Bradley Company, Inc. Reduction of relaxation induced tension scatter in fasteners. 4,995,145, Cl. 29-407.000.
Esquivel, Misael U.: *See*—
Na'kamura, Nobuto; Satoh, Hiroshi; Matsuo; and Esquivel, Misael U., 4,996,236, Cl. 514-659.000.
Essex Composite Systems: *See*—
Wycech, Joseph, 4,995,545, Cl. 228-119.000.
Essilor International Cie General d'Optique: *See*—
Brule, Francois; and Chansavoir, Alain, 4,995,170, Cl. 33-551.000.
Etablissements Jean Charvet: *See*—
Poumey, Michel; and Charvet, Jacques, 4,996,405, Cl. 219-10.493.
Estes, Elvin: *See*—
Walls, W. Alan; Estes, Elvin; Manifold, Steve M.; Spann, Michael L.; and Gully, John H., 4,996,016, Cl. 264-229.000.
ETA S.A. Fabriques d'Ebauches: *See*—
Noirjean, Pierre-Andre , 4,996,676, Cl. 368-73.000.
Ethridge, D. Ray, to Halliburton Logging Services Inc. Neutron generator tube. 4,996,017, Cl. 376-116.000.
Ethyl Corporation: *See*—
Eisenbraun, Allan A.; and Blocker, Wesley C., 4,996,254, Cl. 524-104.000.
Miller, Joseph A., 4,996,340, Cl. 556-190.000.
Euroceltique, S.A.: *See*—
Bhagwat, Dileep; Iny, Oliver; and Pedi, Frank, Jr., 4,996,048, Cl. 424-80.000.
Evans, Marilyn B. Toothbrush and toothpaste holder. 4,995,511, Cl. 206-362.100.
Evans, Maxwell E., to Mack Trucks, Inc. Equalizing suspension arrangement for tandem steering axles with coordinated geometry control of no. 2 steering axle. 4,995,634, Cl. 280-682.000.
Everard, Lloyd D.: *See*—
Wridge, Wilbur S., Jr.; and Everard, Lloyd D., 4,995,124, Cl. 5-450.000.
Ewing, Brent L. Fishing rod and method for weighing a fish and a scale for weighing an object. 4,995,188, Cl. 43-23.000.
Extrude Hone Corporation: *See*—
Rhoades, Lawrence J., 4,995,949, Cl. 204-15.000.
Exxon Research and Engineering Company: *See*—
Coyle, Catherine L.; Greaney, Mark A.; Stiefel, Edward I.; Francis, James N.; and Beltzer, Morton, 4,995,996, Cl. 252-42.700.
Danielsen, Arvid M.; and Shaw, Donald F., 4,996,028, Cl. 422-147.000.
F.A.O.M.S.: *See*—
Curto, Caterino; and Longo, Gianantonio, 4,995,713, Cl. 351-113.000.
F Muller Pty Limited: *See*—
Ward, Allan, 4,995,243, Cl. 62-298.000.
Fabricas Lucia Antonio Betere, S.A. (Flabesa): *See*—
Betere Cabeza, Antonio, 4,995,162, Cl. 29-564.200.
Fabriques de Tabac Reunies, S.A.: *See*—
Berger, Maurice; and Lauenstein, Michael, 4,995,769, Cl. 414-403.000.
da Silva, Domingos, 4,995,406, Cl. 131-105.000.
Factor, Arnold: *See*—
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, 4,996,245, Cl. 523-136.000.
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, 4,996,246, Cl. 523-136.000.
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, 4,996,247, Cl. 523-136.000.
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, 4,996,248, Cl. 523-136.000.
FAG Kugelfischer Georg Schafer (KGaA): *See*—
Moller, Rainer; Pretscher, Manfred; and Schmidt, Anton, 4,995,737, Cl. 384-607.000.
Faiveley Entreprises: *See*—
Martin, Frederic; and Crozat, Georges, 4,996,029, Cl. 422-188.000.
Falco, Robert N., to Cabot Corporation. Line coupling device. 4,995,824, Cl. 439-290.000.
Falk, R. Aaron: *See*—
Houk, Theodore L.; and Falk, R. Aaron, 4,996,527, Cl. 341-83.000.
Fallin, Thomas W.: *See*—
Demane, Michael; Fallin, Thomas W.; Garner, Steve; and Schryver, Jeff, 4,995,883, Cl. 623-23.000.
FAPA S.p.A.: *See*—
Marengo, Osvaldo, 4,995,538, Cl. 224-329.000.
Farese, Thomas R.; and Ferrere, Kenneth E., to Bell Communications Research, Inc. Technique for dynamically changing an ISDN connection during a host session. 4,996,685, Cl. 370-58.100.
Farmos Group Ltd.: *See*—
Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; and Sundquist, Hannu K., 4,996,225, Cl. 514-428.000.
Farrar, David; Flesher, Peter; and Lawrence, Peter R. B., to Allied Colloids Ltd. Polymeric compositions and their production. 4,996,251, Cl. 524-17.000.
Farrell, Grant D.; and Goles, Edward, to Scepter Manufacturing Company Limited. Fastener for securing the closure of a container. 4,995,657, Cl. 292-327.000.
Farrington, Ronald L., to Square D Company. Microprocessor-controlled circuit breaker and system. 4,996,646, Cl. 364-483.000.
Fasco Industries, Inc.: *See*—
Parnell, Clyde B., 4,995,681, Cl. 312-242.000.
Fast, Jacob. Sign holder with shelf attachment. 4,995,182, Cl. 40-649.000.
Faure, Jean-Francois; and Dubost, Bruno, to Pechiney Recherche Groupement D'Interet Economique. Process for the production of aluminum alloys by spray deposition. 4,995,920, Cl. 148-12.70A.
Fearnot, Neal E.: *See*—
Cook, William A.; Fearnot, Neal E.; and Geddes, Leslie A., 4,995,390, Cl. 128-419.0PG.
Federal-Mogul Corporation: *See*—
Babcock, Bryce W.; Kiblawi, Daniel F.; and Wolbers, Eugene A., 4,995,492, Cl. 192-85.0CA.
Pratt, George C.; and Whitney, Warren J., Jr., 4,996,025, Cl. 420-554.000.
Ricci, Richard J.; and Gebhardt, Wallace E., 4,996,400, Cl. 200-345.000.
Feher, Frank R., Jr.: *See*—
Kalota, Dennis J.; McConaghy, John S., Jr.; Foerst, Paul W.; Liu, Paul H.; and Feher, Frank R., Jr., 4,996,369, Cl. 568-615.000.
Feibush, Binyamin: *See*—
Karger, Barry L.; Feibush, Binyamin; Miller, Neil T.; and Figueroa, Alvaro, 4,996,343, Cl. 556-445.000.
Feinman, Jerome: *See*—
Santen, Sven; and Feinman, Jerome, 4,996,694, Cl. 373-22.000.
Ferag AG: *See*—
Kalin, Urs, 4,995,563, Cl. 242-59.000.
Ferenczi, Gyorgy; Erdelyi, Katalin; Somogyi, Maria; Boda, Janos; Fule, Gyorgy; and Aszodi, Gabor, to Magyar Tudomanyos Akademia Muszaki Fizikai Kutato Intezete. Method and apparatus for determining the layer thickness of semiconductor layer structures. 4,995,939, Cl. 156-627.000.
Ferrara, Janice J. Expandable catheter and bridge device. 4,995,872, Cl. 604-280.000.
Ferrarotti, Rinaldo: *See*—
Bernardis, Francesco; Marangon, Claudio; and Ferrarotti, Rinaldo, 4,995,743, Cl. 400-124.000.
Ferreol-Ragotin, Andre : *See*—
Kovac, Josip; and Ferreol-Ragotin, Andre , 4,995,600, Cl. 270-45.000.
Ferrere, Kenneth E.: *See*—
Farese, Thomas R.; and Ferrere, Kenneth E., 4,996,685, Cl. 370-58.100.
Ferrier, Gordon G.: *See*—
Davey, Nigel M.; and Ferrier, Gordon G., 4,996,171, Cl. 501-19.000.
Fessler, Clyde: *See*—
McCarthy, Martin, 4,995,869, Cl. 604-110.000.
Ficken, Geoffrey E.; Edwards, Douglas J.; Mowforth, Clive W.; Maternaghan, Trevor J.; Steiger, Rolf; and Dolden, Victor W., to Ilford Limited. Monomethine compounds. 4,996,141, Cl. 430-583.000.
Field, Bruce F.; and Kasper, Joseph G., to Tennant Company. Automated guided vehicle. 4,996,468, Cl. 318-587.000.
Figueroa, Alvaro: *See*—
Karger, Barry L.; Feibush, Binyamin; Miller, Neil T.; and Figueroa, Alvaro, 4,996,343, Cl. 556-445.000.
Filges, Ralf; Klotmann, Fred; and Wutschke, Hans J., to Kloeckner-Humboldt-Deutz Aktiengesellschaft. Baffles for tube coolers, rotary tubular kilns or the like. 4,995,809, Cl. 432-118.000.
Fine, James M. Clothes hanger structure. 4,995,516, Cl. 211-87.000.
Fine, Jeffrey B.: *See*—
Marschner, Steven S.; and Fine, Jeffrey B., 4,996,072, Cl. 426-417.000.

Finney, Clifton D. Golf clubhead in a corner-back configuration. 4,995,612, Cl. 273-169.000.
Finzel, Lothar, to Siemens Aktiengesellschaft. Configuration with several splicing modules. 4,995,728, Cl. 350-96.210.
Fiorani, Tiziana: *See—*
Marraccini, Antonio; Pasquale, Antonio; and Fiorani, Tiziana, 4,996,370, Cl. 568-674.000.
Fiorda, John H. Autowinder for underwater and all weather camera. 4,996,544, Cl. 354-64.000.
Fiquet, Claire: *See—*
Grollier, Jean F.; and Fiquet, Claire, 4,996,059, Cl. 424-71.000.
Fischer, Paul, to W. L. Gore & Associates, Inc. High capacitance laminates. 4,996,097, Cl. 428-220.000.
Fisher, Arthur: *See—*
Abrams, Lionel; Fisher, Arthur; and Jameson, Ronald F., 4,995,337, Cl. 119-18.000.
Fisher, William B.; Crescentini, Lamberto; and Balint, Laszlo J., to Allied-Signal Inc. Abatement of NO_x from hydroxylamine disulfonate process. 4,996,036, Cl. 423-388.000.
Fishler, Theodor-Morel; Peled, Michael; and Shorr, Leonard M. Process for the polymerization of pentabromobenzylester monoacrylate. 4,996,276, Cl. 526-2927.500.
Flachglas Aktiengesellschaft: *See—*
Groth, Rolf; and Paul, Thomas, 4,995,895, Cl. 65-60.200.
Flake, Lance L.: *See—*
Cox, Roger G.; Yeager, Michael W.; and Flake, Lance L., 4,996,661, Cl. 364-748.000.
Flanigan, Sean: *See—*
Sampson, Robert; and Flanigan, Sean, 4,995,208, Cl. 52-200.000.
Flavourtech Pty. Ltd.: *See—*
Craig, Andrew J. M., 4,995,945, Cl. 202-177.000.
Fleet, George W. J.; Winchester, Bryan; and Carpenter, Neil M., to Monsanto Company. Derivatives of 1,4-dideoxy-1,4-imino-D-mannitol and a process for their preparation. 4,996,329, Cl. 548-453.000.
Fleischer, Robert L., to General Electric Company. Y-Ba-Cu-O superconductor containing radioactive dopants. 4,996,192, Cl. 505-1.000.
Flesher, Peter: *See—*
Farrar, David; Flesher, Peter; and Lawrence, Peter R. B., 4,996,251, Cl. 524-17.000.
Fletcher, Carl C., Jr. Club-separating insert system for golf bags. 4,995,510, Cl. 206-315.600.
Fletton, Richard A.: *See—*
Sutherland, Derek R.; Ramsay, Michael V. J.; Ward, John B.; Porter, Neil; Noble, Hazel M.; Fletton, Richard A.; and Noble, David, 4,996,228, Cl. 514-450.000.
Flipse, Abraham R.; Kay, Peter J.; and Rozendaal, Ewoud, to U.S. Philips Corp. Method of manufacturing a permanent magnet. 4,996,023, Cl. 419-12.000.
Float-On Corporation: *See—*
Poppell, Ralph, 4,995,629, Cl. 280-414.100.
Floyd, Bobby. Variable air volume ventilation system and method. 4,995,307, Cl. 98-34.500.
Floyd, Fred D. Lid wrench. 4,995,295, Cl. 81-3.440.
FMC Corporation: *See—*
Ballenger, William; Sherman, Wayne; and Suter, Michael, 4,995,973, Cl. 210-209.000.
Yourgalite, Ray A.; Moore, Malcolm; Chamberlain, Neal C.; Becicka, Kenneth F.; Hilgeman, Samuel J.; and Moore, Kevin D., 4,995,224, Cl. 53-540.000.
Foerst, Paul W.: *See—*
Kalota, Dennis J.; McConaghy, John S., Jr.; Foerst, Paul W.; Liu, Paul H.; and Feher, Frank R., Jr., 4,996,369, Cl. 568-615.000.
Foller, Werner; and Klann, Holm, to GESTRA Aktiengesellschaft. Thermally controlled valve. 4,995,553, Cl. 236-48.00R.
Ford, David A.; Higginbotham, Gordon J. S.; Pugh, David R.; and Kumar, Naresh, to Rolls-Royce plc. Crucible having a movable dross collector comprising an induction coil. 4,995,593, Cl. 266-227.000.
Ford Motor Company: *See—*
Allor, Richard L.; Herman, John A., Sr.; and DeBell, George C., 4,995,281, Cl. 74-559.000.
Droste, Timothy A.; Middione, Jerome J.; and Kher, Himat B., 4,995,971, Cl. 210-168.000.
Ford New Holland, Inc.: *See—*
Crane, Jack W., 4,995,770, Cl. 414-412.000.
Vansteelant, Marc G., 4,995,216, Cl. 53-64.000.
Forenade Well AB: *See—*
Persson, Malte, 4,995,937, Cl. 156-543.000.
Forschner, Horst. Method and measurement system for the production of garment kits. 4,995,514, Cl. 206-574.000.
Foseco International Limited: *See—*
Kegan, Neil J.; Hitchens, Ian; Robertson, Thomas; and Whitehouse, Paul A., 4,995,592, Cl. 266-44.000.
Foshee, Carolyn S., administratix: *See—*
Preissler, Christopher M.; and Foshee, William R., deceased, 4,995,249, Cl. 70-224.000.
Foshee, William R., deceased: *See—*
Preissler, Christopher M.; and Foshee, William R., deceased, 4,995,249, Cl. 70-224.000.
Foster, Harry C. Power assisted reel type lawn mower. 4,995,227, Cl. 56-249.000.
Fouche, Alain: *See—*
Malbe, Serge; Da Silva, Evelyne; and Fouche, Alain, 4,996,588, Cl. 357-80.000.
Fournier Innovation et Synergie: *See—*
Samreth, Soth; Bellamy, Francois; and Millet, Jean, 4,996,347, Cl. 558-411.000.
Fox, Sidney W.; and Bahn, Peter R. Self-sealing artificial skin comprising copoly-alpha-amino acid. 4,996,292, Cl. 528-328.000.
Fox, Steve: *See—*
Gabourie, Greg; and Fox, Steve, 4,995,671, Cl. 297-439.000.
Francioni, Corrado. System of elements for the creation of graphic compositions. 4,995,813, Cl. 434-96.000.
Francis, David J.; and Bastow, David R., to Minnesota Mining and Manufacturing Company. Shaped foam. 4,996,092, Cl. 428-157.000.
Francis, James N.: *See—*
Coyle, Catherine L.; Greaney, Mark A.; Stiefel, Edward I.; Francis, James N.; and Beltzer, Morton, 4,995,996, Cl. 252-42.700.
Francis, Sam E., Jr. Method of making a chemical thermal pack. 4,995,217, Cl. 53-410.000.
Franck, Gerald R.; and Olsen, David B., to Minnesota Mining and Manufacturing Company. Filter-conditioner for motor cooling liquid. 4,995,452, Cl. 165-119.000.
Franco, Robert S.: *See—*
Zimmer, Hans W.; Martelo, Orlando J.; and Franco, Robert S., 4,996,227, Cl. 514-444.000.
Frank, Richard; and Hofmann, Fritz-Walter, to Siemens Aktiengesellschaft. X-ray image intensifier with electron optics coating. 4,996,414, Cl. 250-213.0VT.
Frank, Richard M., to General Motors Corporation. Method for determining air mass in a crankcase scavenged two-stroke engine. 4,995,258, Cl. 73-118.200.
Franken, Harald: *See—*
Muller, Dietmar; Bauer, Helmut; Franken, Harald; and Seiter, Harry, 4,995,802, Cl. 425-154.000.
Franzen, Kevin J.: *See—*
Mak, Sioe T.; Maginnis, Richard L.; and Franzen, Kevin J., 4,996,513, Cl. 340-310.00R.
Fraunhofer-Gesellschaft zur Forderung der angewandten Forschung e.V.: *See—*
Muller, Dietmar; Bauer, Helmut; Franken, Harald; and Seiter, Harry, 4,995,802, Cl. 425-154.000.
Fraunhofer-Gesellschaft zur Forderung der Angewandten Forshung E.V.: *See—*
Riedel, Wolfgang; Knothe, Manfred; Grisar, Roland; Wolf, Helmut; and Preier, Horst M., 4,995,725, Cl. 356-334.000.
Frazee, James S.: *See—*
Cousins, Russell D.; Frazee, James S.; Gleason, John G.; and Hall, Ralph F., 4,996,214, Cl. 514-311.000.
Frederick, Percy R. Externally mounted R.V. table. 4,995,322, Cl. 108-44.000.
Frederick, William A.: *See—*
Kim, Yong W.; and Frederick, William A., 4,995,955, Cl. 204-157.300.
Freehauf, Eugene G., to Canoga Industries, Inc. Injector/ejector system for rack mounted plug-in modules with front panels. 4,996,631, Cl. 361-415.000.
Freeman, Richard A. Magnetic door stop. 4,995,655, Cl. 292-251.500.
Freerksen, Donald L.: *See—*
Beacom, Thomas J.; and Freerksen, Donald L., 4,996,660, Cl. 364-748.000.
Fremion, Edwin A., to Westvaco Corporation. Eat-in/carryout pizza box. 4,995,557, Cl. 229-125.290.
French State represented by the Minister of Post, Telecommunications and Space: *See—*
Doeuvne, Jean P.; and Mascarin, Guy, 4,996,436, Cl. 250-560.000.
Fresenius, AG: *See—*
Metzner, Klaus, 4,995,959, Cl. 204-411.000.
Fretschner, Erich: *See—*
Merkle, Hans R.; and Fretschner, Erich, 4,996,327, Cl. 548-373.000.
Freyssinet International (STUP): *See—*
De La Fuente, Carlos, 4,995,583, Cl. 248-636.000.
Fried. Krupp Gesellschaft Mit Beschrankter Haftung: *See—*
Carlhoff, Christoph; Lorenzen, Claus-Jurgen; and Nick, Klaus-Peter, 4,995,723, Cl. 356-318.000.
Friedman, Hilda G. De-lousing bag for pets. 4,995,345, Cl. 119-160.000.
Friedrich Grohe Armaturenfabrik GmbH & Co.: *See—*
Pawelzik, Manfred; and Titze, Horst, 4,995,419, Cl. 137-316.000.
Friedrichs, Kurt, to H. Krantz GmbH & Co. Method for high-frequency drying of combustible goods and, with fire suppression. 4,995,172, Cl. 34-1.000.
Frindt, Robert F.: *See—*
Divigalpitiya, W. M. Ranjith; Frindt, Robert F.; and Morrison, S. Roy, 4,996,108, Cl. 428-411.100.
Frischmann, Peter G.: *See—*
Taub, Alan I.; Frischmann, Peter G.; and Lee, Minyoung, 4,995,919, Cl. 148-9.00R.
Frisco Bay Industries of Canada Limited: *See—*
Desjardins, Pierre; Trudel, Paul;; and Leroux, Jean-Marc, 4,996,714, Cl. 382-3.000.
Fryzuk, Michael D.: *See—*
Cullen, William R.; Fryzuk, Michael D.; James, Brian R.; Kang, Guo-Jun; Kutney, James P.; Spogliarich, Roberto; and Thorburn, Ian S., 4,996,361, Cl. 564-304.000.
Fu, Wang C. Rotary type clock ornament lamp circuit structure. 4,996,633, Cl. 362-35.000.
Fuchigami, Masaharu: *See—*
Noda, Masahiro; Fuchigami, Masaharu; and Akagawa, Akira, 4,995,997, Cl. 252-49.500.
Fuji Jukogyo Kabushiki Kaisha: *See—*
Morikawa, Koji, 4,995,354, Cl. 123-65.00V.
Sakamoto, Masanori; Abe, Kunihiro; and Kobayashi Tomoya, 4,996,643, Cl. 364-424.030.

Fuji Photo Film Co., Ltd.: *See*—
Inoue, Noriyuki; Hirano, Katsumi; and Saitou, Mitsuo, 4,996,137, Cl. 430-378.000.
Kanai, Masaharu, 4,996,551, Cl. 354-432.000.
Kato, Eiichi; and Ishii, Kazuo, 4,996,121, Cl. 430-87.000.
Kishimi, Kazutomo, 4,996,537, Cl. 346-1.100.
Miyoshi, Takahito; Kanazawa, Minoru; Sugisaki, Tsutomu; Yamada, Takuzi; and Okuzawa, Yasutoshi, 4,995,199, Cl. 51-326.000.
Negishi, Kenji; Sasaki, Hidemi; and Fujishiro, Takeshi, 4,996,619, Cl. 360-109.000.
Ohgoda, Makoto; and Tamura, Kaoru, 4,996,542, Cl. 346-108.000.
Suga, Shuzo; Satake, Masaki; and Sasaoka, Senzo, 4,996,130, Cl. 430-264.000.
Takagi, Atsushi, 4,996,557, Cl. 355-50.000.
Takemoto, Satoru; Kaneko, Rokusaburo; Miwa, Matsuyuki; and Makino, Seiji, 4,996,555, Cl. 355-44.000.
Tokuda, Kanji; Saeki, Yoshihiko; Sakamoto, Kiichiro; and Matsumoto, Fumio, 4,996,558, Cl. 355-50.000.
Toyama, Tadao; Kunichika, Kenji; Hishiki, Norio; and Nishida, Masahiro, 4,996,135, Cl. 430-309.000.

Fuji Xerox Co., Ltd.: *See*—
Sakaguchi, Yasuo; Takegawa, Ichiro; Takemoto, Makoto; and Murase, Masanori, 4,996,125, Cl. 430-66.000.

Fujii, Harutoshi, to Tachi-S. Co., Ltd. Height adjusting device for vehicle seat. 4,995,580, Cl. 248-421.000.

Fujii, Hiroyuki: *See*—
Yokoyama, Junichi; Urushihara, Tomonori; Itoh, Teruyuki; and Fujii, Hiroyuki, 4,995,359, Cl. 123-188.00M.

Fujii, Morizumi: *See*—
Yoshida, Kinoto; Fujii, Morizumi; Tsuda, Tokihiro; Suda, Shigeo; Kodama, Osamu; Kuroe, Kazuro; Tanikawa, Takumi; Nishimura, Michihiko; and Munakata, Hideyuki, 4,995,932, Cl. 156-242.000.

Fujikawa, Yasuji: *See*—
Wakabayashi, Shigeru; Saijo, Yoshihiro; Yamane, Yoshitaka; and Fujikawa, Yasuji, 4,995,431, Cl. 141-116.000.

Fujimori, Naoji: Harada, Keizo; Yazu, Shuji; and Jodai, Tetsuji, to Sumitomo Electric Industries, Ltd. Ceramic superconducting thin film. 4,996,185, Cl. 505-1.000.

Fujimori, Naoji: *See*—
Higaki, Kenjiro; Harada, Keizo; Fujimori, Naoji; Itozaki, Hideo; and Yazu, Shuji, 4,996,190, Cl. 505-1.000.

Fujio, Katuharu, to Matsushita Electric Industrial Co. Ltd. Enclosed type electric compressor. 4,995,789, Cl. 417-360.000.

Fujisaka, Takahiko: *See*—
Kirimoto, Tetsuo; Fujisaka, Takahiko; and Ohashi, Yoshimasa, 4,996,532, Cl. 342-81.000.

Fujishiro, Takeshi: *See*—
Negishi, Kenji; Sasaki, Hidemi; and Fujishiro, Takeshi, 4,996,619, Cl. 360-109.000.

Fujita, Kazuhiko; and Bessho, Yoshinori, to Brother Kogyo Kabushiki Kaisha. Surface profile measuring device utilizing optical heterodyne interference. 4,995,726, Cl. 356-349.000.

Fujita, Kenjiro: *See*—
Hiramatsu, Takeo; Fujita, Kenjiro; Nagayoshi, Yoshimasa; Hamasaki, Yoshiaki; and Kawai, Satoshi, 4,995,491, Cl. 192-58.00R.

Fujito, Teruaki, to JEOL Ltd. Capacitor stick for NMR probe. 4,996,482, Cl. 324-318.000.

Fujitsu Limited: *See*—
Kanemitsu, Norio; Tabata, Yoshio; and Wakabayashi, Masaru, 4,996,603, Cl. 358-462.000.
Ohshima, Toshio, 4,996,166, Cl. 437-31.000.
Sano, Yoshiaki; Hanazawa, Toshio; and Yoshino, Yoshiro, 4,996,501, Cl. 330-279.000.
Shirasaki, Masahiro, 4,996,574, Cl. 357-23.700.
Watarai, Shinichi; Yasuda, Megumi; Hoki, Yoji; and Inoue, Makoto, 4,996,567, Cl. 355-290.000.
Yamashita, Yoshimi; and Horiuchi, Kei, 4,996,700, Cl. 378-145.000.

Fujitsu VLSI Limited: *See*—
Sano, Yoshiaki; Hanazawa, Toshio; and Yoshino, Yoshiro, 4,996,501, Cl. 330-279.000.

Fujiwa, Takaaki: *See*—
Kojima, Hidetaka; and Fujiwa, Takaaki, 4,996,357, Cl. 562-607.000.

Fujiwara, Hideo: *See*—
Saito, Osamu; Kamezaki, Hisamitsu; Suenaga, Masashi; Nagai, Ryo; Iuchi, Shinichiro; Watanabe, Hitoshi; and Fujiwara, Hideo, 4,996,089, Cl. 428-64.000.

Fujiwara, Michio; Matsumaru, Hiroshi; Kobayashi, Yasushi; Sakai, Yoshio; Yoneda, Kenzi; Dohi, Osamu; and Noguchi, Akihiko, to Hitachi, Ltd. Display guide apparatus of elevator and its display method. 4,995,479, Cl. 187-135.000.

Fujiwara, Takashi: *See*—
Matsuda, Hideo; Fujiwara, Takashi; Yokota, Yoshio; Kitagawa, Mitsuhiko; Iwasaki, Masami; and Watanuki, Kazuo, 4,996,586, Cl. 357-74.000.

Fujiwara, Takutoshi; and Konishi, Motofumi, to Canon Kabushiki Kaisha. File system. 4,996,664, Cl. 364-900.000.

Fukagawa, Yasuo: *See*—
Yoshioka, Takeo; Chida, Noritaka; Watanabe, Azuma; Fukagawa, Yasuo; and Ishikura, Tomoyuki, 4,996,314, Cl. 540-364.000.

Fukatsu, Tsutomu: *See*—
Kashida, Motokazu; Masui, Toshiyuki; Fukatsu, Tsutomu; Takei, Masahiro; Takahashi, Kouji; and Sasatani, Tomohiko, 4,996,607, Cl. 360-18.000.

Fukuchi, Hiroshi; Ishii, Mitsuaki; and Miyazaki, Masaaki, to Mitsubishi Denki Kabushiki Kaisha. Air-fuel ratio control system for use in internal combustion engine. 4,996,644, Cl. 364-431.050.

Fukuchi, Masakazu: *See*—
Morita, Shizuo; Matsuo, Shunji; Haneda, Satoshi; Fukuchi, Masakazu; and Shoji, Hisashi, 4,996,566, Cl. 355-246.000.

Fukuda, Masao, to Kabushiki Kaisha Komatsu Seisakusho. Load weight measuring system mounted on a construction machine. 4,995,468, Cl. 177-139.000.

Fukuda, Yozo: *See*—
Nishimura, Yasuhiro; Suzuki, Motoko; and Fukuda, Yozo, 4,996,200, Cl. 514-185.000.

Fukuhara, Hiroshi: *See*—
Saeki, Kenji; Fukuhara, Hiroshi; Agoo, Tokinori; Taguchi, Toru; Miki, Hisaya; Haneda, Yutaka; and Yoshimoto, Sadao, 4,996,372, Cl. 568-717.000.

Fule, Gyorgy: *See*—
Ferenczi, Gyorgy; Erdelyi, Katalin; Somogyi, Maria; Boda, Janos; Fule, Gyorgy; and Aszodi, Gabor, 4,995,939, Cl. 156-627.000.

Funahashi, Makoto: *See*—
Takada, Mitsuru; Itoh, Hiroshi; Takahashi, Tokuyuki; and Funahashi, Makoto, 4,995,284, Cl. 74-868.000.

Funamoto, Takao: *See*—
Kajiwara, Ryoichi; Funamoto, Takao; Kato, Mituo; Wachi, Hiroshi; and Shida, Tomohiko, 4,996,589, Cl. 357-82.000.

Funderburk, Robert V.: *See*—
Schultze, Eckart F.; Easter, Richard; and Funderburk, Robert V., 4,995,194, Cl. 49-32.000.

Funger, Bernhard: *See*—
Ahrweiler, Karl-Heinz; and Funger, Bernhard, 4,995,147, Cl. 29-116.100.

Funt, John M.: *See*—
Shieh, Chiung-Huei; Funt, John M.; and Ouyang, George B., 4,995,197, Cl. 51-281.00R.

Furuhashi, Yasuhiro: *See*—
Nakamura, Masayuki; Katayama, Kazuyuki; and Furuhashi, Yasuhiro, 4,995,368, Cl. 123-501.000.

Furukawa, Akihiro: *See*—
Hirata, Keiichi; Kawakami, Yasushi; Miura, Tomoko; Mukai, Miyako; Ban, Tomohiro; and Furukawa, Akihiro, 4,995,739, Cl. 400-63.000.
Yamada, Shiro; Hirata, Keiichi; Oishi, Minoru; Morimoto, Yoshinari; Furukawa, Akihiro; and Kawasumi, Atsuko, 4,996,640, Cl. 364-200.000.

Furukawa, Satoru; and Nakanishi, Toshihide, to Kyowa Hakko Kogyo Co., Ltd. Process for producing L-threonine by fermentation. 4,996,147, Cl. 435-115.000.

Furuki, Fumio: *See*—
Tamura, Michio; and Furuki, Fumio, 4,995,667, Cl. 296-216.000.

Furusawa, Eiichi: *See*—
Moore, Richard E.; Furusawa, Eiichi; Norton, Ted R.; Patterson, Gregory M. L.; and Mynderse, Jon S., 4,996,229, Cl. 514-450.000.

Fuse, Toshihiko, to Nippon Pillar Packing Co., Ltd. Magnetic fluid seal device. 4,995,622, Cl. 277-80.000.

Futcher, Ian, to American Cyanamid Company. Herbidical aqueous based microemulsion compositions. 4,995,900, Cl. 71-92.000.

Fyles, Thomas M.: *See*—
Eadie, Donald T.; and Fyles, Thomas M., 4,995,983, Cl. 210-639.000.

G.D. Societa' per Azioni: *See*—
Spatafora, Mario; and Gamberini, Antonio, 4,995,223, Cl. 53-176.000.

G.P. Industries, Inc.: *See*—
Geppelt, Elmo W.; and Poore, William H., 4,995,450, Cl. 165-104.210.

Gabel BmbH: *See*—
Schurmann, Erich, 4,995,666, Cl. 296-216.000.

Gabourie, Greg; and Fox, Steve, to Global Upholstery Co., Ltd. Seat leg system with stabilizer bar. 4,995,671, Cl. 297-439.000.

Gaboury, Michael J.: *See*—
Bell, Cynthia S.; and Gaboury, Michael J., 4,996,523, Cl. 340-781.000.

Gabriels, Joseph E., Jr., to Millipore Corporation. Method for growing cellular tissue. 4,996,154, Cl. 435-240.241.

Gaffney, Thomas R.: *See*—
Pierantozzi, Ronald; Miller, Mildred A.; Listemann, Mark L.; Gaffney, Thomas R.; and Coe, Charles G., 4,996,322, Cl. 564-216.000.

Gahara, William J.; and Johnson, Thomas R., to Worldwide Medical Plastics Inc. Multi-lumen catheters. 4,995,865, Cl. 604-43.000.

Gaiser, Don R.: *See*—
Conners, Patrick J.; Stevens, Lawrence R.; Gaiser, Don R.; and Pennypacker, Frank C., 4,996,161, Cl. 436-132.000.

Gaiser, Robert F.: *See*—
Crumb, Donald A.; Zander, Richard A.; and Gaiser, Robert F., 4,995,676, Cl. 303-9.630.

Gale, Richard M.: *See*—
Doolin, Lawrence E.; Gale, Richard M.; Godfrey, Otis W.; Hamill, Robert L.; Mahoney, David F.; and Yao, Raymond C., 4,996,148, Cl. 435-119.000.

Galib, Samuel H. Intraocular lens and method of surgically implanting same in an eye. 4,995,880, Cl. 623-6.000.

Gall, Martin; and Higuchi, Robert I., to Upjohn Company, The. Amino-9,10-secosteroids useful for treating head injury, spinal cord trauma or stroke. 4,996,318, Cl. 544-295.000.

Gallo, Frank. Controller for an electrostatic precipitator. 4,996,471, Cl. 323-241.000.
Gamberini, Antonio: *See—*
Spatafora, Mario; and Gamberini, Antonio, 4,995,223, Cl. 53-176.000.
Ganzberger, Walter. Welding machine for butt welding of plastic profiles. 4,995,935, Cl. 156-499.000.
Gapinski, D. Mark, to Eli Lilly and Company. Leukotriene antagonists. 4,996,230, Cl. 514-454.000.
Garbett, Keith, to Cooper Industries, Inc. Wear bushing retrieval tool. 4,995,458, Cl. 166-85.000.
Garces, Juan M.: *See—*
Olken, Michael M.; Lee, Guo-shuh J.; and Garces, Juan M., 4,996,388, Cl. 585-828.000.
Gardner-Chavis, Ralph A.; and May, Michael P., to Molecular Technology Corporation; and JC Technology, Inc. Catalytic method for concentrating isotopes. 4,996,033, Cl. 423-249.000.
Gardner, Jeffrey G.; and Gulau, Dennis J., to Dow Chemical Company, The. Nozzle unit and method for using wet abrasives to clean hard surfaces. 4,995,202, Cl. 51-439.000.
Gardner, Philip D., Sr.: *See—*
Steinke, David M.; Blankenship, Michael; Satterfield, Marshall G.; and Gardner, Philip D., Sr., 4,996,090, Cl. 428-71.000.
Garman, James: *See—*
Delau, William D.; Garman, James; and Keith, Kevin, 4,995,313, Cl. 99-467.000.
Garner, Steve: *See—*
Demane, Michael; Fallin, Thomas W.; Garner, Steve; and Schryver, Jeff, 4,995,883, Cl. 623-23.000.
Garneweidner, Peter, to Austria Metall Aktiengesellschaft. Impact absorber for a motor vehicle. 4,995,486, Cl. 188-374.000.
Garrett, Arthur D. Process for and product related to fabricating linked duplex film with trapped printing. 4,995,927, Cl. 156-152.000.
Garrett, Jeffrey L.; Makitka, Harry; Sanchez, Richard J.; and Shepler, Gregory W., to PPG Industries, Inc. Process and apparatus for controlling the thermal environment of glass fiber forming. 4,995,892, Cl. 65-12.000.
Garrigues, Jean-Claude; Laulhe, Rene; and Rieuvernet, Pierre, to Applications Mecaniques et Robinetterie. Actuator employing a fluid under pressure for the driving in rotation of a rotary shaft. 4,995,305, Cl. 92-138.000.
Garrison, Warren B. Scrubbing pail handle. 4,995,526, Cl. 220-94.00R.
Garvey, Michael J.; Griffiths, Ian C.; and Thompson, Ian, to Unilever Patent Holdings B.V. Lubricant comprising an oil-in-water emulsion, a process for the preparation thereof and the use of the lubricant. 4,995,995, Cl. 252-28.000.
Gas Research Institute: *See—*
Bonne, Ulrich; and Matthys, Robert J., 4,996,431, Cl. 250-343.000.
Hilliard, John C., 4,995,805, Cl. 431-10.000.
Gasser, Ernest S., to Sperry Marine Inc. Digital statistical processing for signal parameter determination. 4,996,647, Cl. 364-484.000.
Gatan, Inc.: *See—*
Jones, Joseph S.; and Swann, Peter R., 4,996,433, Cl. 250-443.100.
Gateley, Martin F., to Systemworks Limited. Connector. 4,995,144, Cl. 16-261.000.
Gatter, Michael G.: *See—*
McCulloch, Beth; and Gatter, Michael G., 4,996,380, Cl. 570-211.000.
Gauthier, Edward. Safety ladder. 4,995,474, Cl. 182-201.000.
Gavva, Viktor M.: *See—*
Paton, Boris E.; Vasiliev, Vsevolod V.; Bogdanovsky, Valentin A.; Shelekhov, Konstantin V.; Gavva, Viktor M.; Bigdash, Vladimir D.; Tabunschik, Ivan A.; and Ilchishin, Andrei P., 4,996,409, Cl. 219-130.010.
Gay, Adrian C.: *See—*
Butler, Nicholas D.; Gay, Adrian C.; and Bresenham, Jack E., 4,996,653, Cl. 364-521.000.
Gayler, Robert J.; and Lancefield, Timothy M., to Piper-Mechadyne Limited. Internal combustion engines. 4,995,358, Cl. 123-188.00M.
Gebald, Gregor: *See—*
Guenkinger, Siegfried; Wurster, Markus; Langen, Manfred; and Gebald, Gregor, 4,995,140, Cl. 19-159.00A.
Gebhardt, Wallace E.: *See—*
Ricci, Richard J.; and Gebhardt, Wallace E., 4,996,400, Cl. 200-345.000.
Gebr. Happich GmbH: *See—*
Venn, Peter, 4,995,951, Cl. 204-129.950.
Gebr. Heller Maschinenfabrik GmbH: *See—*
Schmid, Karlheinz, 4,995,160, Cl. 29-568.000.
GEC Alsthom SA: *See—*
Dufournet, Denis; and Perret, Michel, 4,996,398, Cl. 200-148.00A.
Thuries, Edmond; Dufournet, Denis; and Perret, Michel, 4,996,399, Cl. 200-148.00A.
Geddes, Leslie A.: *See—*
Cook, William A.; Fearnot, Neal E.; and Geddes, Leslie A., 4,995,390, Cl. 128-419.0PG.
Gehringer, Hans: *See—*
Bucheler, Manfred; Gehringer, Hans; Klinksiek, Bernd; and Koglin, Bernd, 4,996,004, Cl. 252-314.000.
Geib, Lawrence E.; Bailey, William R.; and Zielinski, James S., to Reed Devices, Inc. Wire termination connector and terminal block. 4,995,829, Cl. 439-409.000.
Geiger, Karl-Heinz: *See—*
Ziegler, Andreas; and Geiger, Karl-Heinz, 4,995,957, Cl. 204-182.800.
Geiger, Peter: *See—*
Kolblin, Karl; and Geiger, Peter, 4,995,316, Cl. 101-123.000.
Geimuplast Peter Mundt GmbH & Co. KG.: *See—*
Stemmer, Gottfried, Jr., 4,995,221, Cl. 53-455.000.
Geluk, Ronald J., to B. V. Optische Industrie "De Oude Delft". Method and device for slit radiography. 4,996,701, Cl. 378-146.000.
General Electic Company: *See—*
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, 4,996,248, Cl. 523-136.000.
General Electric Company: *See—*
Avakian, Roger W., 4,996,244, Cl. 523-136.000.
Case, Allen W., Jr.; and Penney, Carl M., 4,996,693, Cl. 372-66.000.
Cline, Harvey E.; and Hardy, Christopher J., 4,995,394, Cl. 128-653.00A.
D'Antonio, Michael J.; Gibbs, Irving A.; Lane, Lawrence J.; and Lawson, Rodney A., 4,996,519, Cl. 340-653.000.
Davis, Gary C.; and Lewis, Larry N., 4,996,255, Cl. 524-261.000.
Fleischer, Robert L., 4,996,192, Cl. 505-1.000.
McDaniel, David L.; and Petrick, Scott W., 4,996,413, Cl. 250-208.100.
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, 4,996,245, Cl. 523-136.000.
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, 4,996,246, Cl. 523-136.000.
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, 4,996,247, Cl. 523-136.000.
Noble, Milton L.; and Milton, Albert F., 4,996,427, Cl. 250-332.000.
Profera, Charles E., Jr., 4,996,535, Cl. 343-786.000.
Taub, Alan I.; Frischmann, Peter G.; and Lee, Minyoung, 4,995,919, Cl. 148-9.00R.
Webster, Harold F.; Neugebauer, Constantine A.; and Burgess, James F., 4,996,116, Cl. 428-627.000.
General Electric Company, p.l.c., The: *See—*
Nicholas, Beatrice M.; Mosley, Alan; Hilsum, Cyril; and Clark, Michael G., 4,996,104, Cl. 428-323.000.
General Mills, Inc.: *See—*
Marschner, Steven S.; and Fine, Jeffrey B., 4,996,072, Cl. 426-417.000.
General Motors Corporation: *See—*
Cotsman, David N.; Kovach, John; Zuccaro, Dante C.; and Kudwa, Frank J., 4,995,493, Cl. 192-150.000.
Diliello, Laura K.; Miller, Gregory D.; and Steele, Robert E., 4,995,692, Cl. 350-96.160.
Frank, Richard M., 4,995,258, Cl. 73-118.200.
Kennedy, Lawrence C.; and Huth, Ronald G., 4,995,494, Cl. 192-58.00B.
Lederman, Frederick E.; and Johnston, Albert D., 4,995,489, Cl. 192-45.000.
Smith, Jack E., 4,995,196, Cl. 49-477.000.
Stegeman, George T.; Zarger, Tony H.; and Outland, Robert J., 4,995,353, Cl. 123-90.480.
General Resource Corporation: *See—*
Pausch, Josef, 4,995,645, Cl. 285-127.000.
Gensberger, Karl; and Morsch, Joachim, to Hydac Technology GMBH. Solenoid valve. 4,995,586, Cl. 251-30.040.
Gentry, Jefferson L.; Rundzaitis, Alfons; and Hilger, Ronald O., to Associated Mills, Inc. Shower shaver. 4,995,155, Cl. 30-41.000.
George, Glen A.; and Whiting, Douglas L., to STAC Electronics. Write operation with gating capability. 4,996,690, Cl. 371-37.100.
Geppelt, Elmo W.; and Poore, William H., to G.P. Industries, Inc. Heat pipe. 4,995,450, Cl. 165-104.210.
Gerard, Michel: *See—*
Catalayoud, Louis; and Gerard, Michel, 4,996,019, Cl. 376-272.000.
Gerhold, Bruce W.; and Anderson, Richard L., to Phillips Petroleum Company. Dehydrogenation process. 4,996,387, Cl. 585-654.000.
Gerlowski, Leonard E.; Kastelic, John R.; and Korcz, William H., to Shell Oil Company. Method for the fabrication of a multi-ovenable, retortable container apparatus. 4,996,086, Cl. 427-421.000.
Gerstenberger, Roland W.; and Cantrell, Philip E., to Xtramedics, Inc. Method and apparatus for making feminine hygienic interlabia pads. 4,995,150, Cl. 28-119.000.
Gerth, Dale; Ittemann, Peter; and Tesch, Helmut, to BASF Aktiengesellschaft. Heat-curable resin mixture of monocyanate, polycyanate and reactive thermoplastic. 4,996,267, Cl. 525-423.000.
GESTRA Aktiengesellschaft: *See—*
Foller, Werner; and Klann, Holm, 4,995,553, Cl. 236-48.00R.
Ghenassia, Elie: *See—*
Commandeur, Raymond; and Ghenassia, Elie, 4,996,360, Cl. 564-90.000.
Gibbs, Irving A.: *See—*
D'Antonio, Michael J.; Gibbs, Irving A.; Lane, Lawrence J.; and Lawson, Rodney A., 4,996,519, Cl. 340-653.000.
Gibson, Harry W.; and Jois, Yajnanarayana H. R., to Virginia Tech Intellectual Properties, Inc. Formation of acyclic bis (reissert compounds). 4,996,346, Cl. 558-392.000.
Gierschewski, Fritz; Koster, Claus D.; and Luhr, Joachim, to Klockner Ferromatik Desma GmbH. Process and system for molding soles on to shoe uppers. 4,996,012, Cl. 264-40.100.
Gilb, Tyrell T.: *See—*
Colonias, Karen W.; Commins, Alfred D.; Gilb, Tyrell T.; Lin, Jin-Jie; and Moore, Richard D., 4,995,206, Cl. 52-297.000.
Gilroy, Thomas E.: *See—*
Sick, August J.; and Gilroy, Thomas E., 4,996,155, Cl. 435-252.300.
Gilula, Louis A.: *See—*
Destouet, Judy M.; Eichling, John O.; Gilula, Louis A.; Monsees, Barbara S.; and Young, Vernon L., 4,995,882, Cl. 623-8.000.

Gimple, James J.: *See—*
Lasley, Charles T.; and Gimple, James J., 4,995,560, Cl. 239-708.000.
Gingerich, Leo L.: *See—*
Burkinshaw, Jeffrey R.; and Gingerich, Leo L., 4,996,383, Cl. 585-516.000.
Gingrich, Marlin K.: *See—*
Weaver, Robert C.; and Semion, Robert, 4,995,663, Cl. 296-100.000.
Ginnaga, Akihiro; Morokuma, Kazunori; Aihara, Katsutoshi; and Sakoh, Mitsuo, to Juridical Foundation The Chemo-Sero-Therapeutic Research Institute. Method for preparing pertussis toxin toxoid using HcHo and amino acids. 4,996,299, Cl. 530-409.000.
Giordano, Sergio: *See—*
Greco, Alberto; Giordano, Sergio; Pozzi, Enrico; and Blasioli, Patrizia, 4,996,283, Cl. 528-80.000.
Girault, Eric; and Arnulf, Paul, to Salomon S. A. Binding device for ski boot. 4,995,632, Cl. 280-615.000.
Girotra, Nirindar N.: *See—*
Biftu, Tesfaye; Bugianesi, Robert L.; Girotra, Nirindar N.; Ponpipom, Mitree M.; Sahoo, Soumya P.; and Kuo, Chan H., 4,996,203, Cl. 514-231.500.
GKSS- Forschungszentrum Geesthacht GmbH: *See—*
Hilgendorff, Walter; Kahn, Gerhard; and Kaschemekat, Jurgen, 4,995,977, Cl. 210-321.690.
Glaser, Bert M., to Johns Hopkins University, The. Neovascularization inhibitors and methods for their production and use. 4,996,159, Cl. 435-70.300.
Glaxo Group Limited: *See—*
Lunts, Lawrence H. C., 4,996,218, Cl. 514-365.000.
Gleason, John G.: *See—*
Cousins, Russell D.; Frazee, James S.; Gleason, John G.; and Hall, Ralph F., 4,996,214, Cl. 514-311.000.
Global Upholstery Co., Ltd.: *See—*
Gabourie, Greg; and Fox, Steve, 4,995,671, Cl. 297-439.000.
Glogan, David J.: *See—*
Schappler, Joseph J.; Glogan, David J.; and Burnham, William L., 4,996,548, Cl. 354-149.110.
Glomb, Hans: *See—*
Kanne, Friedrich; Pfleger, Klaus; Glomb, Hans; Arnold, Gerhard; Boettcher, Klaus; and Kursawe, Siegfried, 4,996,026, Cl. 422-106.000.
Glory Kogyo Kabushiki Kaisha: *See—*
Naito, Seishi; and Hayashi, Masaaki, 4,996,677, Cl. 369-14.000.
Gnann, Michael: *See—*
Appl, Herbert; Gnann, Michael; Jahr, Wolfgang; and Rossberger, Erwin, 4,995,550, Cl. 228-175.000.
Godecker, William J.: *See—*
Brown, Paul D.; Godecker, William J.; and Parme, Charles B., 4,995,792, Cl. 417-366.000.
Godfrey, Christopher M. V. Apparatus for and method of cutting joints. 4,995,435, Cl. 144-363.000.
Godfrey, Otis W.: *See—*
Doolin, Lawrence E.; Gale, Richard M.; Godfrey, Otis W.; Hamill, Robert L.; Mahoney, David F.; and Yao, Raymond C., 4,996,148, Cl. 435-119.000.
Goetz, Norbert: *See—*
Wild, Jochen; Harreus, Albrecht; and Goetz, Norbert, 4,996,377, Cl. 570-141.000.
Goh, David, to Scan Coin AB of Jagershillgatan 26, S-213. Coin sorters. 4,995,848, Cl. 453-3.000.
Golay, Marcel, to Perkin-Elmer Corporation, The. Method of assembling a chromatography column. 4,995,163, Cl. 29-527.100.
Gold, Elijah H.: *See—*
Berger, Joel G.; Chang, Wei K.; Gold, Elijah H.; and Elliott, Arthur J., 4,996,202, Cl. 514-213.000.
Gold, Ronald R.: *See—*
Reed, Wilmer H., III; and Gold, Ronald R., 4,995,272, Cl. 73-865.600.
Gold, Ronald S.: *See—*
Jachimowicz, Karen E.; and Gold, Ronald S., 4,995,718, Cl. 353-31.000.
Goldbeck, Larry J.: *See—*
Taylor, Dennis E.; and Goldbeck, Larry J., 4,995,851, Cl. 474-101.000.
Golden Eagle Archery, Inc.: *See—*
Mussack, Kevin R., 4,995,373, Cl. 124-25.600.
Goldhammer, Kurt R.: *See—*
Liguori, Ralph; Goldhammer, Kurt R.; and Laermer, Lothar, 4,996,630, Cl. 361-412.000.
Goldman, Jerome L. Semisubmersible vessel with captured constant tension body. 4,995,762, Cl. 405-195.000.
Goldowsky, Michael P.; Hisano, Teiji; Karidis, John P.; Shibuya, Hiromi; and Ueda, Osamu, to International Business Machines Corporation. Impact printer actuator using magnet and electromagnetic coil and method of manufacture. 4,995,744, Cl. 400-157.200.
Goldthorpe, James F. Multimode game board. 4,995,611, Cl. 273-123.00R.
Goles, Edward: *See—*
Farrell, Grant D.; and Goles, Edward, 4,995,657, Cl. 292-327.000.
Golick, Leonard R.: *See—*
Howell, David A.; Hydeman, Jeffrey E.; Slater, Jeffrey L.; Bodnar, Richard J.; Golick, Leonard R.; Sekera, Robert S.; and Roth, Charles H., Jr., 4,995,158, Cl. 29-723.000.
Gonnering, John B.; and Tharman, Paul A., to Briggs & Stratton Corporation. Engine shut-off circuit. 4,995,357, Cl. 123-198.0DC.
Goodman, David S.; and Rudoy, Edward, to ITT Corporation. Connector for paired wire cable. 4,995,828, Cl. 439-405.000.
Goodman, Jack: *See—*
Inaba, Makoto; Hayashi, Masaaki; Hashiguchi, Toshihiko; Hibino, Hiroki; Sasa, Hiroyuki; Barlow, David E.; Ohshima, Yutaka; Ishihara, Kohichiro; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Klosterman, Frank; and Goodman, Jack, 4,995,396, Cl. 128-654.000.
Goodman, Murray: *See—*
Melmon, Kenneth L.; Goodman, Murray; Khan, Manzoor M.; Marr-Leisy, Debra; and Verlander, Michael, 4,996,221, Cl. 514-399.000.
Goodway Tools Corporation: *See—*
Reichborn, Per K., 4,995,137, Cl. 15-327.100.
Goodyear Tire & Rubber Co., The: *See—*
Ogata, Naoya, 4,996,178, Cl. 502-159.000.
Pyke, James B.; Bauer, Richard G.; and Burlett, Donald J., 4,996,262, Cl. 525-177.000.
Pyke, James B.; Bauer, Richard G.; Cohen, Martin P.; and Handa, Pawan K., 4,996,263, Cl. 525-178.000.
Richeson, Donald E.; and Tweedie, Judith A., 4,996,269, Cl. 525-444.000.
Weber, Michael J.; and Grant, Stuart D., 4,995,438, Cl. 152-518.000.
Wideman, Lawson G.; and Sandstrom, Paul H., 4,996,258, Cl. 524-274.000.
Wideman, Lawson G.; and Sandstrom, Paul H., 4,996,295, Cl. 530-221.000.
Gornik, Robert J. Apparatus for cleaning a paint roller pad. 4,995,749, Cl. 401-9.000.
GORO S.A.: *See—*
Schick, Jean-Francois, 4,995,542, Cl. 227-112.000.
Gortsema, Frank P.; McCauley, John R.; Pellet, Regis J.; Miller, James G.; and Rabo, Jule A., to UOP. Midbarrel hydrocracking process employing rare earth pillared clays. 4,995,964, Cl. 208-112.000.
Goss, Michael; and Mincy, John E., to Nalco Chemical Company. Mill scale de-oiling. 4,995,912, Cl. 134-2.000.
Goto, Hitoshi: *See—*
Kisima, Yoshio; Iwanaga, Teruo; and Goto, Hitoshi, 4,995,273, Cl. 73-865.600.
Gott, Erich, to Reiflock-Umwelttechnik Margot Reichmann. Process for anaerobically degrading highly loaded process waste waters. 4,995,981, Cl. 210-603.000.
Gould, Inc.: *See—*
Young, Peter L.; Cech, Jay; and Li, Kin, 4,996,584, Cl. 357-71.000.
Gould, Steven G., to Paper Converting Machine Company. Method and apparatus for facilitating product changeover in the manufacture of fluff pads for disposable diapers. 4,995,141, Cl. 19-148.000.
Grabbe, Dimitry G., to AMP Incorporated. Pivotal electrical contact. 4,995,816, Cl. 439-71.000.
Grabbe, Dimitry G., to AMP Incorporated. Electrical contact. 4,995,817, Cl. 439-71.000.
Gracey, Michael; Hopkins, Frank; Robinson, Jennifer; and Snow, Stephen, to Cadbury Schweppes Proprietary Limited. Reducing bacterial content in water. 4,996,232, Cl. 514-474.000.
Graham, S. Neal; and Terry, Thomas E. Starwheel cap selecting apparatus. 4,995,503, Cl. 198-392.000.
Gramlich, Walter: *See—*
Lauterbach, Gerald; Pape, Frank F.; and Gramlich, Walter, 4,996,365, Cl. 568-427.000.
Grant, Stuart D.: *See—*
Weber, Michael J.; and Grant, Stuart D., 4,995,438, Cl. 152-518.000.
Gray, Gerald A., Jr., to Xerox Corporation. Large document copying system. 4,996,556, Cl. 355-50.000.
Gray, William F. Remote supervisory monitoring and control apparatus connected to monitored equipment. 4,996,703, Cl. 379-40.000.
Greaney, Mark A.: *See—*
Coyle, Catherine L.; Greaney, Mark A.; Stiefel, Edward I.; Francis, James N.; and Beltzer, Morton, 4,995,996, Cl. 252-42.700.
Greco, Alberto; Giordano, Sergio; Pozzi, Enrico; and Blasioli, Patrizia, to Enichem Synthesis S.p.A.; and Boston S.p.A. Reactive hot melt composition. 4,996,283, Cl. 528-80.000.
Greco, Carl C.; and Burk, Johst H., to Akzo America Inc. Preparation of rare earth alkoxides using catalyst. 4,996,300, Cl. 534-15.000.
Green Cross Corporation: *See—*
Tsukada, Minoru; Tanaka, Kenji; and Iga, Yoshiro, 4,996,050, Cl. 424-94.200.
Greenway, J. Michael: *See—*
Siegel, Jodie M.; Sternlieb, Herschel; Connolly, Timothy J.; Greenway, J. Michael; Parker, D. A.; and Simon, Arlene T., 4,995,151, Cl. 26-69.00R.
Greenwich Pharmaceuticals Inc.: *See—*
Ronsen, Bruce; Arora, Sudershan K.; and Thomas, Albert V., 4,996,195, Cl. 514-23.000.
Gresham, Gerald L. Tie down apparatus for wheelchair. 4,995,775, Cl. 410-10.000.
Gries, Thomas, to Hoechst Aktiengesellschaft. Process for the purification and stabilization of perfluoropolyethers. 4,996,368, Cl. 568-601.000.
Griffiths, Ian C.: *See—*
Garvey, Michael J.; Griffiths, Ian C.; and Thompson, Ian, 4,995,995, Cl. 252-28.000.
Grimes, Donald L.: *See—*
Cocco, Vincent L.; and Grimes, Donald L., 4,996,681, Cl. 369-273.000.

Grimes, Gary J.: *See*—
Blonder, Greg E.; Blyler, Lee L., Jr.; and Grimes, Gary J., 4,995,686, Cl. 350-96.150.

Grimshaw, Allen: *See*—
Sask, David; Obrejanu, Marcel; and Grimshaw, Allen, 4,995,462, Cl. 166-304.000.

Grindey, Gerald B.: *See*—
Taylor, Edward C.; Kuhnt, Dietmar G.; Shih, Chuan; and Grindey, Gerald B., 4,996,206, Cl. 514-258.000.

Grisar, Roland: *See*—
Riedel, Wolfgang; Knothe, Manfred; Grisar, Roland; Wolf, Helmut; and Preier, Horst M., 4,995,725, Cl. 356-334.000.

Grise, Frederick G. J.: *See*—
Cunningham, Paul A.; and Grise, Frederick G. J., 4,995,835, Cl. 439-668.000.

Grohmann, Paul, to Messer Grieshiem GmbH. Process and device for autogenous cutting with liquid oxygen. 4,995,918, Cl. 148-9.00R.

Grollier, Jean F.; and Fiquet, Claire, to L'Oreal. Composition for the treatment of keratin fibers, based on amphoteric polymer and cationic polymer. 4,996,059, Cl. 424-71.000.

Groos, Horst; and Schutte, Karl-Heinz, to SMS Sutton, Inc.; and SMS Hasenclever GmbH, a part interest. Method for taking up a billet produced in the extrusion or tube-making press and control of a take-up device for this purpose. 4,995,253, Cl. 72-257.000.

Grote & Hartmann GmbH & Co. KG: *See*—
Drecker, Frank, 4,995,833, Cl. 439-596.000.

Groth, Rolf; and Paul, Thomas, to Flachglas Aktiengesellschaft. Process for the manufacture of a toughened and/or bent sheet of glass with a silver coating. 4,995,895, Cl. 65-60.200.

Grubbs, Robert A.; and Brown, Gregory P., to Hughes Aircraft Company. Processing of concatenated radar measurements to re-establish signal phase coherence. 4,996,534, Cl. 342-195.000.

Gruber, Harald; Hinrichsmeyer, Kurt; Horbach, Heinz G.; and Stadler, Ewald E., to International Business Machines Corporation. Electronic package. 4,996,585, Cl. 357-74.000.

Gruber, Walter; and Maag, Horst, to Hansa Metallwerke AG. Sanitary fitting. 4,995,585, Cl. 251-30.030.

GTE Valenite Corporation: *See*—
Coleman, Robert L., 4,995,766, Cl. 407-34.000.

Guardian Technologies, Inc.: *See*—
Conners, Patrick J.; Stevens, Lawrence R.; Gaiser, Don R.; and Pennypacker, Frank C., 4,996,161, Cl. 436-132.000.

Gubelmann, Michel: *See*—
Doussain, Claude; Gubelmann, Michel; and Popa, Jean-Michel, 4,996,376, Cl. 568-934.000.

Guckel, Henry; and Burns, David W., to Wisconsin Alumni Research Foundation. Sealed cavity semiconductor pressure transducers and method of producing the same. 4,996,082, Cl. 427-99.000.

Guenkinger, Siegfried; Wurster, Markus; Langen, Manfred; and Gebald, Gregor, to Zinser Textilmaschinen GmbH. Sliver can transporting apparatus and method for a draw frame of a textile machine. 4,995,140, Cl. 19-159.00A.

Guilinger, Terry R.; Kelly, Michael J.; Martin, Samuel B., Jr.; Stevenson, Joel O.; and Tsao, Sylvia S., to United States of America, Energy. Porous siliconformation and etching process for use in silicon micromachining. 4,995,954, Cl. 204-129.750.

Guiver, Michael D.; and Kutowy, Oleh, to Canada, National Research Council of Canada/Conseil de Recherches. Method of manufacturing halogenated aromatic polysulfone compounds and the compounds so produced. 4,996,271, Cl. 525-537.000.

Gula, Lance: *See*—
McKee, Jere L.; Thomas, Glenn R.; Gula, Lance; and Beatty, William E., Jr., 4,996,507, Cl. 335-195.000.

Gulau, Dennis J.: *See*—
Gardner, Jeffrey G.; and Gulau, Dennis J., 4,995,202, Cl. 51-439.000.

Gullikson, Darryl C.: *See*—
Torres, Daniel L.; Gullikson, Darryl C.; Case, M. Bruce; and Neher, Ralph A., 4,995,413, Cl. 137-1.000.

Gully, John H.: *See*—
Walls, W. Alan; Estes, Elvin; Manifold, Steve M.; Spann, Michael L.; and Gully, John H., 4,996,016, Cl. 264-229.000.

Gulton Industries, Inc.: *See*—
Aikens, Wallace R., 4,996,632, Cl. 362-32.000.

Gunter, Werthmann, to Nokia Unterhaltungselektronik. Pocket measuring instrument for measuring ionizing radiation. 4,996,429, Cl. 250-336.100.

Gunther, Bernd: *See*—
Dagustany, Amer; Spriestersbach, Jochen; Gunther, Bernd; and Knall, Gerhard, 4,995,917, Cl. 148-3.000.

Gupta, Neelam, to United States of America, Army. Object detection using two channel active optical sensors. 4,996,430, Cl. 250-339.000.

Gupte, Pradeep M.: *See*—
Arai, Toshiyuki; Gupte, Pradeep M.; and Lasker, Sigmund E., 4,996,041, Cl. 424-9.000.

Gurusamy, Narayanasamy, to Mallinckrodt, Inc. Novel intermediates for the production of 2,4,5-trifluorobenzoyl fluoride. 4,996,355, Cl. 562-493.000.

Gutner, Kenneth H. Storage facility for video cassettes. 4,995,682, Cl. 312-311.000.

Guy, Yoram, to Monroe Auto Equipment Company. Ultrasonic Doppler velocity sensing within a hydraulic actuator. 4,995,635, Cl. 280-707.000.

Gyger, Roger F.: *See*—
Kooy, Richard J.; Andrepont, John S.; Gyger, Roger F.; and Tyree, Lewis, Jr., 4,995,234, Cl. 60-648.000.

Gyobu, Kiyohito: *See*—
Haneda, Shinichi; Terada, Haruhiko; Azuchi, Kazunari; and Gyobu, Kiyohito, 4,996,634, Cl. 362-82.000.

H. & K. Automated Musical Creations Co.: *See*—
Heischober, Norman; and Keogler, Paul, 4,995,290, Cl. 84-160.000.

H. Krantz GmbH & Co.: *See*—
Friedrichs, Kurt, 4,995,172, Cl. 34-1.000.

Haag, Rainer: *See*—
Tsaklakidis, Christos; Bosies, Elmar; Schultz, Michael; Haag, Rainer; Herrmann, Dieter; and Pahlke, Wulf, 4,996,219, Cl. 514-341.000.

Haase, Henry; Schneider, Joachim; and Alber, Pierre, to INA Walzlager Schaeffler KG. Radial rolling bearings. 4,995,736, Cl. 384-448.000.

Habitz, Peter A.; Hsieh, Chang-Ming; and Huang, Yi-Shiou, to International Business Machines Corporation. Method for forming lateral PNP transistor. 4,996,164, Cl. 437-31.000.

Hack, Michael; Shaw, John G.; and Shur, Michael, to Xerox Corporation. Vertical thin film transistor and optical sensor having leakage current suppression elements. 4,996,573, Cl. 357-23.700.

Haddad, Elie: *See*—
Talgam, Yoav; Reed, Paul A.; Haddad, Elie; and Klingshirn, James A., 4,996,641, Cl. 364-200.000.

Haddad, Muin S.; Meyers, Bernard L.; and Eryman, William S., to Amoco Corporation. Maleic anhydride catalysts and process for their manufacture. 4,996,179, Cl. 502-209.000.

Hadjiiski, Mincho B.: *See*—
Lingorski, Nikola A.; Hadjiiski, Mincho B.; Yovchev, Rumen B.; Spassov, Kamen B.; and Savov, Peter H., 4,995,732, Cl. 374-139.000.

Haefele, Douglas M.; Lamptey, Jonathan C.; and Marlow, Joseph L., to Pioneer Hi-Bred International, Inc. Biological control of corn seed rot and seedling blight. 4,996,049, Cl. 424-93.000.

Hag GF Aktiengesellschaft: *See*—
Love, Graham; Schellhaass, Karl; Rathjen, Barbel; and Schwarz, Jurgen, 4,996,066, Cl. 426-77.000.

Hagiuda, Nobuyoshi: *See*—
Matsui, Hideki; Hagiuda, Nobuyoshi; Yokonuma, Norikazu; Sakamoto, Hiroshi; and Iida, Yoshikazu, 4,996,550, Cl. 354-420.000.

Hagiwara, Yoshimune: *See*—
Yamaguchi, Noboru; Nakamura, Hideo; Hagiwara, Yoshimune; Sato, Tsukasa; and Koizumi, Haruo, 4,996,659, Cl. 364-579.000.

Hahn, Norbert; and Naegeli, Robert W., to Rite-Hite Corporation. Dock leveler lift assembly and method for operation. 4,995,130, Cl. 14-71.300.

Hakamata, Kyoji: *See*—
Imaeda, Hirofumi; and Hakamata, Kyoji, 4,995,370, Cl. 123-583.000.

Halene, Clemens, to Huit Gesellschaft Fur-Hydrid-Und Wasserstofftechnik m.b.H. Method and apparatus for compressing hydrogen gas. 4,995,235, Cl. 62-46.200.

Hall, Douglas R., to Reel-Tech Inc. Component feeder system. 4,995,157, Cl. 29-740.000.

Hall, Ralph F.: *See*—
Cousins, Russell D.; Frazee, James S.; Gleason, John G.; and Hall, Ralph F., 4,996,214, Cl. 514-311.000.

Hall, Ron E.; and Heitzmann, David E., to MOR/ryde, Inc. Trailing arm modular axle suspension unit. 4,995,636, Cl. 180-716.000.

Hallett, Christopher: *See*—
Diwell, Alan F.; Hallett, Christopher; Ansell, Graham; and Hayes, John W., 4,996,180, Cl. 502-304.000.

Halliburton Company: *See*—
Baldridge, Morris G., 4,995,457, Cl. 166-70.000.

Halliburton Logging Services Inc.: *See*—
Ethridge, D. Ray, 4,996,017, Cl. 376-116.000.
Sinclair, Paul L., 4,996,489, Cl. 324-639.000.

Halpern, Donald F.; and Robin, Mark L., to BOC, Inc. Method for fluorodecarboxylation. 4,996,371, Cl. 568-683.000.

Hamada, Akiyoshi: *See*—
Mori, Shinichi; Hamada, Akiyoshi; Yagoto, Mitsutoshi; and Murakami, Masanori, 4,996,541, Cl. 346-108.000.

Hamaguchi, Osamu: *See*—
Shiraki, Manabu; and Hamaguchi, Osamu, 4,995,658, Cl. 292-336.300.

Hamair Chemicals, Ltd.: *See*—
Nishimura, Yasuhiro; Suzuki, Motoko; and Fukuda, Yozo, 4,996,200, Cl. 514-185.000.

Hamakawa, Wataru, to Minolta Camera Kabushiki Kaisha. Automatic document feeder provided for copying apparatus. 4,996,568, Cl. 355-308.000.

Hamamatsu Photonics Kabushiki Kaisha: *See*—
Takahashi, Hironori; Aoshima, Shinichiro; and Tsuchiya, Yutaka, 4,996,475, Cl. 324-96.000.

Hamasaki, Toshihiko, to Kabushiki Kaisha Toshiba. Bipolar transistor. 4,996,581, Cl. 357-34.000.

Hamasaki, Yoshiaki: *See*—
Hiramatsu, Takeo; Fujita, Kenjiro; Nagayoshi, Yoshimasa; Hamasaki, Yoshiaki; and Kawai, Satoshi, 4,995,491, Cl. 192-58.00R.

Hamashima, Eiji: *See*—
Okamoto, Yoshio; Nakamura, Yozo; Uchiyama, Kyoichi; Watanabe, Haruo; Kosuge, Tokuo; Onishi, Akira; Terasaki, Akashi; Ando, Hiroyuki; and Hamashima, Eiji, 4,995,559, Cl. 239-493.000.

Hamatani, Toshiji: *See*—
Inujima, Takashi; Yamazaki, Shunpei; Konuma, Toshimitsu; Hamatani, Toshiji; Sakama, Mitsunori; Yamaguchi, Toshiharu; and Kobayashi, Ippei, 4,995,706, Cl. 350-350.00S.

Hamburgen, William R., to Digital Equipment Corporation. Evaporator having etched fiber nucleation sites and method of fabricating same. 4,995,451, Cl. 165-104.330.

Hamburger Stahlwerke GmbH: *See*—
Reumann, Manfred; Preiss, Wolfgang; and Kubicek, Andreas, 4,995,251, Cl. 72-132.000.

Hamill, Robert L.: *See*—
Doolin, Lawrence E.; Gale, Richard M.; Godfrey, Otis W.; Hamill, Robert L.; Mahoney, David F.; and Yao, Raymond C., 4,996,148, Cl. 435-119.000.

Hamilton, David M., Jr.; and Kemp, Richard A., to Shell Oil Company. Concurrent isomerization and disproportionation of olefins. 4,996,386, Cl. 585-646.000.

Hammer, Gregory V.: *See*—
Webb, Norval E.; and Hammer, Gregory V., 4,996,061, Cl. 424-475.000.

Hanajima, Mabito: *See*—
Hattori, Atsushi; Hanajima, Mabito; Moriyasu, Masaharu; Iwamoto, Toshikazu; and Matsumoto, Kazuhiko, 4,996,458, Cl. 313-402.000.

Hanazawa, Toshio: *See*—
Sano, Yoshiaki; Hanazawa, Toshio; and Yoshino, Yoshiro, 4,996,501, Cl. 330-279.000.

Hancock, Clyde J.; and Hendershot, James R., to Pacific Scientific Company. Method of making an electronically commutated reluctance motor. 4,995,159, Cl. 29-596.000.

Handa, Balraj K.; Johnson, William H.; and Machin, Peter J., to Hoffmann-La Roche Inc. Hydroxylamine bearing amino acid derivatives as collagenase inhibitors. 4,996,358, Cl. 562-621.000.

Handa, Pawan K.: *See*—
Pyke, James B.; Bauer, Richard G.; Cohen, Martin P.; and Handa, Pawan K., 4,996,263, Cl. 525-178.000.

Haneda, Satoshi: *See*—
Morita, Shizuo; Matsuo, Shunji; Haneda, Satoshi; Fukuchi, Masakazu; and Shoji, Hisashi, 4,996,566, Cl. 355-246.000.

Haneda, Shinichi; Terada, Haruhiko; Azuchi, Kazunari; and Gyobu, Kiyohito, to Aisin Seiki Kabushiki Kaisha; and Aisin Keikinzoku Kabushiki Kaisha. Bumper reinforcement for automotive vehicles. 4,996,634, Cl. 362-82.000.

Haneda, Yutaka: *See*—
Saeki, Kenji; Fukuhara, Hiroshi; Agoo, Tokinori; Taguchi, Toru; Miki, Hisaya; Haneda, Yutaka; and Yoshimoto, Sadao, 4,996,372, Cl. 568-717.000.

Hanna, David A., to Paradygm Science & Technologies, Inc. Chop mode operated mass spectrometer for reducing the effect of line signals. 4,996,423, Cl. 250-281.000.

Hanna, John E., to Motorola, Inc. Common mode compensation for differential integrating filter. 4,996,498, Cl. 330-258.000.

Hansa Metallwerke AG: *See*—
Gruber, Walter; and Maag, Horst, 4,995,585, Cl. 251-30.030.

Hanselmann, Daniel: *See*—
Binder, Rolf; and Hanselmann, Daniel, 4,995,142, Cl. 19-80.00R.

Hanson, Garry O. Pulse furnace. 4,995,376, Cl. 126-110.00C.

Haour, Georges: *See*—
Jolly, Mark; Negaty-Hindi, Guy; and Haour, Georges, 4,995,444, Cl. 164-97.000.

Hara, Eiichi: *See*—
Nagata, Tatsuya; Watanabe, Michihiro; Hara, Eiichi; and Yamada, Takehiko, 4,996,438, Cl. 250-211.00R.

Hara, Naoki; and Yamaguchi, Nobuo, to Honda Giken Kogyo Kabushiki Kaisha. Air cleaner and carburetor layout for motorcycles. 4,995,471, Cl. 180-219.000.

Hara, Zenichiro, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for processing video signal. 4,996,598, Cl. 358-183.000.

Harada, Keizo: *See*—
Fujimori, Naoji; Harada, Keizo; Yazu, Shuji; and Jodai, Tetsuji, 4,996,185, Cl. 505-1.000.
Higaki, Kenjiro; Harada, Keizo; Fujimori, Naoji; Itozaki, Hideo; and Yazu, Shuji, 4,996,190, Cl. 505-1.000.

Harada, Masatomi: *See*—
Tsukamoto, Shin-ichi; Nagaoka, Hitoshi; Usuda, Shinji; Harada, Masatomi; and Tamura, Toshinari, 4,996,210, Cl. 514-278.000.

Harada, Nozomu: *See*—
Nishida, Yasuaki; Iino, Yoshiki; Ohtake, Hiroshi; Abe, Masahide; Yoshikawa, Shigeo; Endo, Yukio; Matsunaga, Yoshiyuki; and Harada, Nozomu, 4,996,600, Cl. 358-213.220.

Haraga, Koichi; Takahama, Kazuhide; and Uchimura, Mitsuo, to Tokyo Electric Co., Ltd. Label printer. 4,996,539, Cl. 346-76.0PH.

Harbor Branch Oceanographic Institution, Inc.: *See*—
Bird, Kimon T., 4,996,389, Cl. 800-200.000.

Hardy, Christopher J.: *See*—
Cline, Harvey E.; and Hardy, Christopher J., 4,995,394, Cl. 128-653.00A.

Harman, Gary E.: *See*—
Smith, Victoria L.; Wilcox, Wayne F.; and Harman, Gary E., 4,996,157, Cl. 435-254.000.

Harreus, Albrecht: *See*—
Wild, Jochen; Harreus, Albrecht; and Goetz, Norbert, 4,996,377, Cl. 570-141.000.

Harris, Donald L., to Telectronics Pacing Systems, Inc. Multielectrode quick connect cardiac pacing lead connector assembly. 4,995,389, Cl. 128-419.00P.

Harrison, Franklyn: *See*—
Dodd, Peter G.; and Harrison, Franklyn, 4,996,464, Cl. 315-289.000.

Hart, Lawrence M.: *See*—
Hauser, Oscar G.; Anderson, Robert W.; and Hart, Lawrence M., 4,996,425, Cl. 250-325.000.

Hartwell, George E.: *See*—
Bowman, Robert G.; Molzahn, David C.; and Hartwell, George E., 4,996,363, Cl. 564-470.000.

Haruta, Koichi: *See*—
Mizumoto, Kunihiko; Haruta, Koichi; and Kajiura, Hirokazu, 4,995,923, Cl. 148-304.000.

Harvey, Robert T.; and White, David C., to NCR Corporation. Base for stackable assemblies. 4,996,628, Cl. 361-393.000.

Hasebe, Kanteru; Matsuoka, Hiroshi; and Yanagi, Kyotaro, to Bando Chemical Industries, Inc. Flat belt transmission. 4,995,855, Cl. 474-167.000.

Hasegawa, Izumi, to AMP Incorporated. Noise filter connector. 4,995,834, Cl. 439-620.000.

Hasegawa, Kazuhiro, to Kawasaki Steel Corporation. Preparation of carbon microballoons. 4,996,009, Cl. 264-5.000.

Hasegawa, Kazuyoshi: *See*—
Nagai, Seiichi; Ishii, Mitsuo; and Hasegawa, Kazuyoshi, 4,995,687, Cl. 350-96.200.

Hasegawa, Yukinobu; Shimomura, Hiroyoshi; Murai, Koichi; Maruyama, Masatoshi; and Tange, Toyokichi, to Nippon Carbide Kogyo Kabushiki Kaisha. Toner for developing an electrostatically charged image. 4,996,127, Cl. 430-109.000.

Hasenbein, Norbert: *See*—
Koehler, Gernot; Schmidt-Thuemmes, Juergen; Hasenbein, Norbert; Schlemmer, Lothar; and Dietsche, Wolfram, 4,996,259, Cl. 524-276.000.

Hashida, Hideo; Kanno, Hideki; Okada, Senri; Nakamura, Kokichi; and Sumimoto, Haruyoshi, to Hitachi, Ltd. Method and apparatus for continuously melting material by induction heating. 4,996,402, Cl. 219-10.410.

Hashiguchi, Toshihiko: *See*—
Inaba, Makoto; Hayashi, Masaaki; Hashiguchi, Toshihiko; Hibino, Hiroki; Sasa, Hiroyuki; Barlow, David E.; Ohshima, Yutaka; Ishihara, Kohichiro; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Klosterman, Frank; and Goodman, Jack, 4,995,396, Cl. 128-654.000.

Hashimoto, Hideaki: *See*—
Taniguchi, Yoshihiro; and Hashimoto, Hideaki, 4,996,605, Cl. 358-474.000.

Hashimoto, Kazuhiko: *See*—
Nomura, Noboru; Ueno, Atsushi; Hashimoto, Kazuhiko; and Kinoshita, Satoshi, 4,996,123, Cl. 430-20.000.

Hashimoto, Takeshi, to Olympus Optical Co., Ltd. Vari-focal lens system. 4,995,707, Cl. 350-427.000.

Hasumi, Keiji: *See*—
Mitsui, Yasuhiro; Hasumi, Keiji; Watase, Shinichiro; Kuriyama, Katsumi; and Nakano, Kazuo, 4,996,422, Cl. 250-281.000.

Hata, Akio: *See*—
Nakachi, Takeshi; Hata, Akio; and Watanabe, Yoshihisa, 4,996,272, Cl. 526-62.000.

Hatada, Kenzo, to Matsushita Electric Industrial Co., Ltd. Stack type semiconductor package. 4,996,583, Cl. 357-70.000.

Hatakawa, Yoshio: *See*—
Matsumoto, Shusaku; Hatakawa, Yoshio; and Nakajima, Akihiko, 4,995,911, Cl. 127-48.000.
Matsumoto, Shusaku; Hatakawa, Yoshio; and Nakajima, Akihiko, 4,996,309, Cl. 536-119.000.

Hatakeyama, Hidetoshi; and Kashiba, Takashi, to Mitsubishi Gas Chemical Company. Methods for treating food and a deoxodizer package in a microwave oven. 4,996,068, Cl. 426-234.000.

Hatakeyama, Yasunori: *See*—
Koga, Toshiaki; and Hatakeyama, Yasunori, 4,995,562, Cl. 242-35.6DE.

Hatch, Robert P.: *See*—
Buckler, Robert T.; and Hatch, Robert P., 4,996,332, Cl. 549-285.000.

Hatcher, Richard P. Bait for controlling darkling beetles, lesser metal worms and hide beetles. 4,996,053, Cl. 424-410.000.

Hato, Hitoshi: *See*—
Yamamoto, Tomiaki; Murayama, Akio; Kondo, Susmu; Hato, Hitoshi; Kamagami, Shinichi; and Matsumoto, Shoichi, 4,995,704, Cl. 350-334.000.

Hatton, John J., to Dowty Rotol Limited. Hydraulic shock absorber with telescopic casings. 4,995,597, Cl. 267-64.150.

Hattori, Atsushi; Hanajima, Mabito; Moriyasu, Masaharu; Iwamoto, Toshikazu; and Matsumoto, Kazuhiko, to Mitsubishi Denki Kabushiki Kaisha. Shadow mask assembly for color cathode ray tube. 4,996,458, Cl. 313-402.000.

Hattori, Kiyoshi: *See*—
Marui, Kuniyoshi; and Hattori, Kiyoshi, 4,996,715, Cl. 455-33.000.

Hattori, Takaji: *See*—
Hyodo, Youichi; Muramatsu, Tadao; and Hattori, Takaji, 4,995,755, Cl. 403-133.000.

Hauk, Rolf, to Deutsche Voest-Alpine Industrieanlagenbau GmbH. Method for the pretreatment of a lumpy carbon carrier. 4,995,904, Cl. 75-445.000.

Hauser, Oscar G.; Anderson, Robert W.; and Hart, Lawrence M., to Xerox Corporation. Method and apparatus for increasing corona efficiency in an ionographic imaging device. 4,996,425, Cl. 250-325.000.

Hausman Hazlitt, Andrea J.; and Richey, Warren F., to Dow Chemical Company, The. Method and apparatus for quantitative measurement of ionic and organic contaminants remaining on cleaned surfaces. 4,996,160, Cl. 436-2.000.

Havins, Felton H. Apparatus for automatically raising and lowering boat motors. 4,995,839, Cl. 440-6.000.

Hawkswell, Victor T., to Emhart Industries, Inc. Suction pick-up apparatus for electrical or electronic components. 4,995,662, Cl. 294-64.100.

Hawsey, Robert A.; and Bailey, J. Milton, to United States of America, Energy. Ultra-high speed permanent magnet axial gap alternator with multiple stators. 4,996,457, Cl. 310-268.000.

Hayakawa, Tokuji: *See—*
Hayashi, Ressei; and Hayakawa, Tokuji, 4,995,399, Cl. 128-680.000.

Hayakawa, Youichi; Kuwayama, Yoshinari; and Yamada, Yoshihiro, to Aisin AW Co., Ltd. Fail-safe hydraulic control valves in an automatic transmission. 4,995,285, Cl. 74-869.000.

Hayashi, Hiroo: *See—*
Matsui, Takeshi; Watanabe, Takehiko; Miyazaki, Katsunori; and Hayashi, Hiroo, 4,996,182, Cl. 503-200.000.

Hayashi, Masaaki: *See—*
Inaba, Makoto; Hayashi, Masaaki; Hashiguchi, Toshihiko; Hibino, Hiroki; Sasa, Hiroyuki; Barlow, David E.; Ohshima, Yutaka; Ishihara, Kohichiro; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Klosterman, Frank; and Goodman, Jack, 4,995,396, Cl. 128-654.000.
Naito, Seishi; and Hayashi, Masaaki, 4,996,677, Cl. 369-14.000.

Hayashi, Norihiko; Katada, Tsuyoshi; and Koizumi, Yukio, to Kabushiki Kaisha Kobe Seiko Sho. Steering controlling device for wheel crane. 4,995,472, Cl. 180-234.000.

Hayashi, Ressei; and Hayakawa, Tokuji, to Colin Electronisc Co., Ltd. Blood pressure measuring system. 4,995,399, Cl. 128-680.000.

Hayashi, Ryutaro; and Kaneko, Noriaki, to Pioneer Electronic Corporation. Optical disc manufacturing apparatus. 4,995,799, Cl. 425-111.000.

Hayashi, Saigiro: *See—*
Tsuruoka, Shigeyoshi; and Hayashi, Saigiro, 4,995,332, Cl. 118-66.000.

Hayes, John W.: *See—*
Diwell, Alan F.; Hallett, Christopher; Ansell, Graham; and Hayes, John W., 4,996,180, Cl. 502-304.000.

Hays, George E.; and Classen, Theodore M., to Phillips Petroleum Company. Process and apparatus for hydrogenating hydrocarbons. 4,995,961, Cl. 208-108.000.

Hazan, Jean-Pierre: *See—*
Steers, Michel; Hazan, Jean-Pierre; and Delmas, Gilles, 4,995,244, Cl. 62-155.000.

Hazelden, Roger J.; Sheppard, Ian J.; and Taft, Philip A., to Lucas Industries public limited company. Vehicle brake. 4,995,480, Cl. 188-1.110.

Hazelrigg, Mark J.: *See—*
Nafziger, John L.; and Hazelrigg, Mark J., 4,996,351, Cl. 560-352.000.

Hazue, Masaaki: *See—*
Sakata, Isao; Nakajima, Susumu; Koshimizu, Koichi; Samejima, Natsuki; Inohara, Kazumi; Takata, Hiroyuki; Yamauchi, Hirohiko; Ueda, Nobuo; and Hazue, Masaaki, 4,996,312, Cl. 540-145.000.

Healey, John N. C.: *See—*
Carlin, Brian A. C.; Healey, John N. C.; Leonard, Graham S.; and Tovey, Geoffrey D., 4,996,222, Cl. 514-400.000.

Heck, James V.: *See—*
Chang, Michael N.; Chiang, Yuan-Ching P.; Heck, James V.; and Lewis, Michael D., 4,996,231, Cl. 514-467.000.

Hector, Louis G.; and Sheu, Shen S., to Aluminum Company of America. Brightness enhancement with textured roll. 4,996,113, Cl. 428-600.000.

Hed, Aharon Z., to International Superconductor Corp. Temporal and spatial control of field topologies in solenoids. 4,996,508, Cl. 335-216.000.

Hediger, Alfred: *See—*
Thomas, Friedrich-Werner; Schadlich-Stubenrauch, Jurgen; and Hediger, Alfred, 4,995,733, Cl. 374-140.000.

Hedrick, Geoffrey S. M., to Innovative Solutions & Support, Incorporated. Densitometer with remotely disposed control electronics. 4,996,656, Cl. 364-558.000.

Heene, Hans F.: *See—*
Schill, Jurgen; Heene, Hans F.; Stahl, Rainer; and Weber, Friedrich, 4,995,790, Cl. 417-360.000.

Heep, Jerry; and Henderson, James, to Tandy Corporation. Intercom telephone. 4,996,709, Cl. 379-160.000.

Hehl, Karl. Injection molding machine provided with a conveyor for delivering molding from the machine. 4,995,801, Cl. 425-151.000.

Heilmann, Steven M.: *See—*
Rasmussen, Jerald K.; Heilmann, Steven M.; and Palensky, Frederick J., 4,996,243, Cl. 522-99.000.

Heindl, Alfons; Laguette, Stephen W.; and Lintula, Leanne M., to Pudenz-Schulte Medical Research Corporation. Ventriculostomy reservoir. 4,995,856, Cl. 604-8.000.

Heineken Technisch Beheer B.V.: *See—*
Versteegh, Christian W., 4,995,979, Cl. 210-521.000.

Heinemann, Joachim: *See—*
Beicht, Bernd; Heinemann, Joachim; Keller, Frank; and Tinz, Reinhard, 4,995,433, Cl. 141-312.000.

Heinonen, Mauno: *See—*
Tervamaki, Jukka; Heinonen, Mauno; Priha, Matti; and Koivisto, Juha, 4,995,432, Cl. 141-130.000.

Heinz, Hans-Detlef; Kohler, Burkhard; Meyer, Rolf-Volker; Reinking, Klaus; and Sommer, Alexa, to Bayer Aktiengesellschaft. Free-flowing polyarylene sulfides crystallizing with delay. 4,996,256, Cl. 524-112.000.

Heischober, Norman; and Keogler, Paul, to H. & K. Automated Musical Creations Co. Apparatus and method for controlling a pneumatically powered music-maker. 4,995,290, Cl. 84-160.000.

Heiter, G. L.: *See—*
Buchanan, W. A.; and Heiter, G. L., 4,995,815, Cl. 439-63.000.

Heitzmann, David E.: *See—*
Hall, Ron E.; and Heitzmann, David E., 4,995,636, Cl. 180-716.000.

Heller, Michael J.; and Jablonski, Edward J., to Syngene, Inc. Fluorescent stokes shift probes for polynucleotide hybridization. 4,996,143, Cl. 435-6.000.

Hellman, Robert R., Sr. Method and apparatus for forming and welding thin-wall tubing. 4,995,549, Cl. 228-147.000.

Helmer, John C.: *See—*
Anderson, Robert L.; and Helmer, John C., 4,995,958, Cl. 204-298.200.

Helmstetter, Richard C.: *See—*
Parente, Richard E.; De La Cruz, Richard; and Helmstetter, Richard C., 4,995,609, Cl. 273-80.200.

Hemmerich, Stefan: *See—*
Pecht, Israel; and Hemmerich, Stefan, 4,996,296, Cl. 530-350.000.

Hendershot, James R.: *See—*
Hancock, Clyde J.; and Hendershot, James R., 4,995,159, Cl. 29-596.000.

Henderson, Brian R.: *See—*
Marmar, Joel L.; and Henderson, Brian R., 4,995,381, Cl. 128-79.000.

Henderson, James: *See—*
Heep, Jerry; and Henderson, James, 4,996,709, Cl. 379-160.000.

Hendrick, Roy W., Jr., to Mission Research Corporation. Optical clutter scene simulator. 4,996,437, Cl. 250-252.100.

Hendrix, James E.: *See—*
Cooke, William M.; Hendrix, James E.; and Tolbert, Thomas W., 4,996,099, Cl. 428-245.000.

Henkel Corporation: *See—*
Ross, Stanley E.; and Nasser, AlexSandra C., 4,995,884, Cl. 8-115.600.

Henkel Kommanditgesellschaft auf Aktien: *See—*
Behler, Ansgar; and Ploog, Uwe, 4,996,364, Cl. 564-475.000.
McDaniel, Robert S., Jr.; and Johnson, Donald L., 4,996,306, Cl. 536-18.600.
von Rybinski, Wolfgang; and Koester, Rita, 4,995,998, Cl. 252-61.000.

Henkel Research Corporation: *See—*
Ching, Ta Y.; and Lin, Lon-Tang W., 4,996,342, Cl. 556-437.000.

Henn, Rolf; and Leppkes, Reinhard. Composite elements having improved resistance against stress cracking corrosion, most preferably for low temperature housing compartments. 4,996,103, Cl. 428-305.500.

Herden, Werner: *See—*
Denz, Helmut; and Herden, Werner, 4,995,365, Cl. 123-479.000.

Herley, James A., to Xerox Corporation. Developer material mixing apparatus. 4,996,565, Cl. 355-245.000.

Herman, John A., Sr.: *See—*
Allor, Richard L.; Herman, John A., Sr.; and DeBell, George C., 4,995,281, Cl. 74-559.000.

Herriau, Auguste; and Herriau, Paul, to Societe Sogefina, Societe De Gestion Financiere Armoricaine. Setting wheels for seed drills. 4,995,325, Cl. 111-189.000.

Herriau, Paul: *See—*
Herriau, Auguste; and Herriau, Paul, 4,995,325, Cl. 111-189.000.

Herrmann, Dieter: *See—*
Tsaklakidis, Christos; Bosies, Elmar; Schultz, Michael; Haag, Rainer; Herrmann, Dieter; and Pahlke, Wulf, 4,996,219, Cl. 514-341.000.

Herzog, Kenneth J. Movable auxiliary hopper. 4,995,781, Cl. 414-680.000.

Hess, Richard F.; Liebel, Kurt A.; and Yount, Larry J., to Honeywell Inc. Fault recovery mechanism, transparent to digital system function. 4,996,687, Cl. 371-10.100.

Hettinger, William P.: *See—*
Berkebile, Donald C.; Lee, Donald M.; Veneziano, Larry D.; Lauer, Joseph J.; Booth, Roy E.; and Hettinger, William P., 4,996,037, Cl. 423-447.400.

Hetzel, Thomas; and Rozek, Roy J., to Thomas Industries Incorporated. Noise reducing wear shield for piston face. 4,995,795, Cl. 417-571.000.

Hewitt, Charles W.; and Black, Kirby S., to University of California, The Regents of the. Combined topical and systemic method of administration of cyclosporine. 4,996,193, Cl. 514-11.000.

Hewlett-Packard: *See—*
Dack, David G.; Huckett, Eric P.; and Macintosh, David W., 4,996,695, Cl. 375-10.000.

Hewlett-Packard Company: *See—*
Hilton, Howard E., 4,996,530, Cl. 341-120.000.
Larson, Ronald K.; and Imperato, John L., 4,996,500, Cl. 330-279.000.
Tambe, Atul; Chu, David; and Cosart, Lee D., III, 4,996,474, Cl. 324-78.00D.

Hey, John B., to Neonics, Inc. System and method for recommending items. 4,996,642, Cl. 364-419.000.

Hibino, Hiroki: *See—*
Inaba, Makoto; Hayashi, Masaaki; Hashiguchi, Toshihiko; Hibino, Hiroki; Sasa, Hiroyuki; Barlow, David E.; Ohshima, Yutaka; Ishihara, Kohichiro; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Klosterman, Frank; and Goodman, Jack, 4,995,396, Cl. 128-654.000.

Hicks, Ray T. Combination cutter and bagger for photographic negatives. 4,995,219, Cl. 53-411.000.

Higaki, Kenjiro; Harada, Keizo; Fujimori, Naoji; Itozaki, Hideo; and Yazu, Shuji, to Sumitomo Electric Industries, Ltd. Superconducting thin film and a process for depositing the same. 4,996,190, Cl. 505-1.000.

Higginbotham, Gordon J. S.: *See—*
Ford, David A.; Higginbotham, Gordon J. S.; Pugh, David R.; and Kumar, Naresh, 4,995,593, Cl. 266-227.000.

Higuchi, Robert I.: *See—*
Gall, Martin; and Higuchi, Robert I., 4,996,318, Cl. 544-295.000.

Higuchi, Tutomu: *See—*
Kambe, Shigeharu; and Higuchi, Tutomu, 4,995,796, Cl. 418-9.000.

Hilgeman, Samuel J.: *See—*
Yourgalite, Ray A.; Moore, Malcolm; Chamberlain, Neal C.; Becicka, Kenneth F.; Hilgeman, Samuel J.; and Moore, Kevin D., 4,995,224, Cl. 53-540.000.

Hilgendorff, Walter; Kahn, Gerhard; and Kaschemekat, Jurgen, to GKSS- Forschungszentrum Geesthacht GmbH. Apparatus for filtering and separating flow medium. 4,995,977, Cl. 210-321.690.

Hilger, Ronald O.: *See—*
Gentry, Jefferson L.; Rundzaitis, Alfons; and Hilger, Ronald O., 4,995,155, Cl. 30-41.000.

Hilliard, John C., to Gas Research Institute. Method and apparatus for increasing radiant heat production of hydrocarbon fuel combustion systems. 4,995,805, Cl. 431-10.000.

Hilsum, Cyril: *See—*
Nicholas, Beatrice M.; Mosley, Alan; Hilsum, Cyril; and Clark, Michael G., 4,996,104, Cl. 428-323.000.

Hilton, Howard E., to Hewlett-Packard Company. Statistically based continuous autocalibration method and apparatus. 4,996,530, Cl. 341-120.000.

Hinden, Milton. Stock material for forming air turning vanes and air guide devices. 4,995,426, Cl. 138-39.000.

Hine, Nathan P.; and Wells, Robert L., Jr., to Spectra, Inc. Method for forming a gas removing device for an ink jet system. 4,995,940, Cl. 156-629.000.

Hino Jidosha Kogyo Kabushiki Kaisha: *See—*
Nakamura, Masayuki; Katayama, Kazuyuki; and Furuhashi, Yasuhiro, 4,995,368, Cl. 123-501.000.

Hinrichs, Michael; Homolla, Jurgen; Schormair, Eckart; Czempik, Klaus; and Hornig, Rolf, to EFFEM GmbH. Holder for bird food packed in portion containers. 4,995,342, Cl. 119-18.000.

Hinrichsmeyer, Kurt; Straehle, Werner; Kelley, Gordon A., Jr.; and Noth, Richard W., to International Business Machines Corporation. Integrated semiconductor chip package. 4,996,587, Cl. 357-74.000.

Hinrichsmeyer, Kurt: *See—*
Gruber, Harald; Hinrichsmeyer, Kurt; Horbach, Heinz G.; and Stadler, Ewald E., 4,996,585, Cl. 357-74.000.

Hinzen, Dieter: *See—*
Weber, Karl-Heinz; Walther, Gerhard; Schneider, Claus; Hinzen, Dieter; Kuhn, Franz J.; and Lehr, Erich, 4,996,224, Cl. 514-424.000.

Hirabayashi, Koichi, to Rheon Automatic Machinery Co., Ltd. Apparatus for quantitatively extruding food material. 4,995,804, Cl. 425-238.000.

Hirai, Kiyomiki; Takeuchi, Koji; Ito, Nobuo; and Abe, Masahiro, to Ajinomoto Co., Inc. Trihydrazide latent curing agent for epoxy resins. 4,996,286, Cl. 528-123.000.

Hiraishi, Shigetoshi: *See—*
Otani, Masaaki; Hiraishi, Shigetoshi; and Hyodo, Kenji, 4,996,183, Cl. 503-208.000.

Hiramatsu, Takeo; Fujita, Kenjiro; Nagayoshi, Yoshimasa; Hamasaki, Yoshiaki; and Kawai, Satoshi, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha; and Koyo Seiko Kabushiki Kaisha. Power transmission apparatus. 4,995,491, Cl. 192-58.00R.

Hiramoto, Tadashi: *See—*
Kitahara, Koichi; Shimada, Takashi; Akita, Noboru; Hiramoto, Tadashi; and Sasaki, Kohhei, 4,996,030, Cl. 423-210.000.

Hirano, Katsumi: *See—*
Inoue, Noriyuki; Hirano, Katsumi; and Saitou, Mitsuo, 4,996,137, Cl. 430-378.000.

Hirao, Yoshichika; and Hosoya, Nobukazu, to Sanyo Electric Co., Ltd. Phase synchronizing circuit in video signal receiver and method of establishing phase synchronization. 4,996,596, Cl. 358-158.000.

Hirata, Keiichi; Kawakami, Yasushi; Miura, Tomoko; Mukai, Miyako; Ban, Tomohiro; and Furukawa, Akihiro, to Brother Kogyo Kabushiki Kaisha. Text editing device for erasing hyphenated words located on two lines. 4,995,739, Cl. 400-63.000.

Hirata, Keiichi: *See—*
Yamada, Shiro; Hirata, Keiichi; Oishi, Minoru; Morimoto, Yoshinari; Furukawa, Akihiro; and Kawasumi, Atsuko, 4,996,640, Cl. 364-200.000.

Hiratsuka, Toshiro: *See—*
Ishikawa, Youhei; Hiratsuka, Toshiro; Abe, Hirotsugu; Takagaki, Hisashi; and Yamashita, Sadao, 4,996,506, Cl. 333-219.100.

Hirn, Doris D.; Boin, Joyce R.; and Breakwell, Susan L. Combination walker/cane/quad cane. 4,995,412, Cl. 135-67.000.

Hirokawa, Jun: *See—*
Tokuhiro, Tomoya; Koibuchi, Nobutaka; Miyauchi, Teruhiko; Kikuchi, Koshin; Hirokawa, Jun; Yamashiro, Kunio; Nishizuka, Sakae; Watanabe, Ippei; Maruo, Shozo; Tsutsui, Yohichiro; and Ishikawa, Sadahito, 4,995,765, Cl. 406-117.000.

Hirokawa, Koichi: *See—*
Nakadai, Yoshikazu; Taranishi, Daiya; Hirokawa, Koichi; and Matsumoto, Nobuki, 4,995,602, Cl. 271-207.000.

Hirose, Katsuhiko: *See—*
Tate, Takao; Nakamura, Norihiko; Noguchi, Hiroshi; Kawagoe, Michio; Baika, Toyokazu; Kato, Kichiro; Kido, Yoshio; Hirose, Katsuhiko; Nihei, Hiroaki; and Masubuchi, Masahiko, 4,995,347, Cl. 123-65.0BA.

Hisano, Teiji: *See—*
Goldowsky, Michael P.; Hisano, Teiji; Karidis, John P.; Shibuya, Hiromi; and Ueda, Osamu, 4,995,744, Cl. 400-157.200.

Hishida, Noriaki, to Nippon Densan Corporation. Spindle motor with non-contact seal. 4,996,613, Cl. 360-99.080.

Hishiki, Norio: *See—*
Toyama, Tadao; Kunichika, Kenji; Hishiki, Norio; and Nishida, Masahiro, 4,996,135, Cl. 430-309.000.

Hitachi America, Ltd.: *See—*
Yamauchi, Teruo; and Sasayama, Akao, 4,995,367, Cl. 123-494.000.

Hitachi Automotive Engineering Co., Ltd.: *See—*
Okamoto, Yoshio; Nakamura, Yozo; Uchiyama, Kyoichi; Watanabe, Haruo; Kosuge, Tokuo; Onishi, Akira; Terasaki, Akashi; Ando, Hiroyuki; and Hamashima, Eiji, 4,995,559, Cl. 239-493.000.

Hitachi Construction Machinery Co., Ltd.: *See—*
Imai, Kuninori; Shiokawa, Takeji; Kato, Shigeo; Ishikawa, Isao; Ikeda, Toshimichi; and Otake, Kan, 4,995,711, Cl. 350-529.000.

Hitachi Device Engineering Co., Ltd.: *See—*
Kume, Hitoshi; Kamigaki, Yoshiaki; Adachi, Tetsuo; Tsukada, Toshihisa; Komori, Kazuhiro; Nishimoto, Toshiaki; Muto, Tadashi; and Koizumi, Toshiko, 4,996,571, Cl. 357-23.500.

Hitachi, Ltd.: *See—*
Fujiwara, Michio; Matsumaru, Hiroshi; Kobayashi, Yasushi; Sakai, Yoshio; Yoneda, Kenzi; Dohi, Osamu; and Noguchi, Akihiko, 4,995,479, Cl. 187-135.000.
Hashida, Hideo; Kanno, Hideki; Okada, Senri; Nakamura, Kokichi; and Sumimoto, Haruyoshi, 4,996,402, Cl. 219-10.410.
Imai, Kuninori; Shiokawa, Takeji; Kato, Shigeo; Ishikawa, Isao; Ikeda, Toshimichi; and Otake, Kan, 4,995,711, Cl. 350-529.000.
Ishino, Takashi; Hiyama, Isao; Nagano, Yousuke; Shikamori, Tamotu; Turuta, Shizuo; Kamano, Toshiyasu; and Ohsugi, Hiroshi, 4,995,247, Cl. 68-12.00R.
Kajiwara, Ryoichi; Funamoto, Takao; Kato, Mituo; Wachi, Hiroshi; and Shida, Tomohiko, 4,996,589, Cl. 357-82.000.
Kenbo, Nobumitsu, 4,996,650, Cl. 364-519.000.
Kitamura, Masashi; Kobayashi, Takashi; Kakiuchi, Shunji; Yamaguchi, Kiyoshi; Tomeoku, Hiroshi; Maki, Naoki; Nakata, Jyoji; and Uno, Yasumichi, 4,996,496, Cl. 328-228.000.
Kume, Hitoshi; Kamigaki, Yoshiaki; Adachi, Tetsuo; Tsukada, Toshihisa; Komori, Kazuhiro; Nishimoto, Toshiaki; Muto, Tadashi; and Koizumi, Toshiko, 4,996,571, Cl. 357-23.500.
Maeda, Akira; Sano, Koichi; Yokoyama, Tetsuo; and Koizumi, Hideaki, 4,996,480, Cl. 324-309.000.
Manaka, Toshio; and Shida, Masami, 4,995,366, Cl. 123-492.000.
Mimura, Tadao; and Kato, Yoshiaki, 4,996,424, Cl. 250-288.000.
Mitsui, Yasuhiro; Hasumi, Keiji; Watase, Shinichiro; Kuriyama, Katsumi; and Nakano, Kazuo, 4,996,422, Cl. 250-281.000.
Nagata, Tatsuya; Watanabe, Michihiro; Hara, Eiichi; and Yamada, Takehiko, 4,996,438, Cl. 250-211.00R.
Nishiyama, Hisashi; Katakura, Kageyoshi; and Ogawa, Toshio, 4,995,397, Cl. 128-661.090.
Nomura, Takaaki, 4,996,665, Cl. 364-900.000.
Ohmura, Keiji; Okuno, Sumio; Takeichi, Michifumi; Okazaki, Masato; and Tsuruda, Hitoshi, 4,995,321, Cl. 105-397.000.
Okamoto, Yoshio; Nakamura, Yozo; Uchiyama, Kyoichi; Watanabe, Haruo; Kosuge, Tokuo; Onishi, Akira; Terasaki, Akashi; Ando, Hiroyuki; and Hamashima, Eiji, 4,995,559, Cl. 239-493.000.
Shimoyashiki, Shigehiro; and Kawabe, Ryuhei, 4,996,020, Cl. 376-313.000.
Tobita, Tomoyuki; and Yamamoto, Yoshimi, 4,995,266, Cl. 73-706.000.
Yamaguchi, Noboru; Nakamura, Hideo; Hagiwara, Yoshimune; Sato, Tsukasa; and Koizumi, Haruo, 4,996,659, Cl. 364-579.000.
Yanagihara, Hitoshi; and Tokushuku, Nobuhiro, 4,996,682, Cl. 369-275.400.

Hitachi Maxell, Ltd.: *See—*
Saito, Osamu; Kamezaki, Hisamitsu; Suenaga, Masashi; Nagai, Ryo; Iuchi, Shinichiro; Watanabe, Hitoshi; and Fujiwara, Hideo, 4,996,089, Cl. 428-64.000.

Hitachi Tokyo Electronics Co., Ltd.: *See—*
Mitsui, Yasuhiro; Hasumi, Keiji; Watase, Shinichiro; Kuriyama, Katsumi; and Nakano, Kazuo, 4,996,422, Cl. 250-281.000.

Hitchens, Ian: *See—*
Kegan, Neil J.; Hitchens, Ian; Robertson, Thomas; and Whitehouse, Paul A., 4,995,592, Cl. 266-44.000.

Hiyama, Isao: *See—*
Ishino, Takashi; Hiyama, Isao; Nagano, Yousuke; Shikamori, Tamotu; Turuta, Shizuo; Kamano, Toshiyasu; and Ohsugi, Hiroshi, 4,995,247, Cl. 68-12.00R.

Hladik, Joseph C., Jr. Cutting blade for rotary cutting machinery. 4,995,228, Cl. 56-255.000.

Hlavka, Joseph J.: *See—*
Bitha, Panayota; Hlavka, Joseph J.; and Lin, Yang-I, 4,996,337, Cl. 556-137.000.
Ho, Chung-Kuo. Dual purpose chafing pot. 4,996,410, Cl. 219-432.000.
Hodgkinson & Corby Limited: *See—*
Orpwood, Roger; and Swain, Ian D., 4,995,628, Cl. 280-304.100.
Hoechst Aktiengesellschaft: *See—*
Gries, Thomas, 4,996,368, Cl. 568-601.000.
Scherowsky, Gunter; and Schreiber, Peter, 4,996,330, Cl. 548-544.000.
Weber, Jurgen; Kampmann, Detlef; and Kniep, Claus, 4,996,316, Cl. 544-1.000.
Wilharm, Peter; Merrem, Hans-Joachim; and Pawlowski, Georg, 4,996,301, Cl. 534-556.000.
Hoechst Celanese Corporation: *See—*
Mulholland, Bruce M., 4,996,253, Cl. 524-91.000.
Hoechst CeramTec Aktiengesellschaft: *See—*
Do-Thoi, Tha; and Popp, Klaus, 4,996,111, Cl. 428-432.000.
Hoechst-Roussel Pharmaceuticals Inc.: *See—*
Effland, Richard C.; Davis, Larry; Kapples, Kevin J.; and Olsen, Gordon E., 4,996,205, Cl. 514-250.000.
Hoenig, Eckhardt, to Siemens Aktiengesellschaft. Magnetometer device with a Dewar vessel for measuring weak magnetic fields. 4,996,479, Cl. 324-248.000.
Hoffarth, Paul G.: *See—*
Rampley, Thomas N.; and Hoffarth, Paul G., 4,995,807, Cl. 431-9.000.
Hoffmann, Herwig: *See—*
Bott, Kaspar; Hoffmann, Herwig; Scheidmeir, Walter; and Trapp, Horst, 4,996,324, Cl. 546-339.000.
Hoffmann-La Roche Inc.: *See—*
Barner, Richard; and Hubscher, Josef, 4,996,375, Cl. 568-853.000.
Handa, Balraj K.; Johnson, William H.; and Machin, Peter J., 4,996,358, Cl. 562-621.000.
Mohacsi, Erno, 4,996,352, Cl. 562-401.000.
Schildknecht, Eugene G.; and Untawale, Govind G., 4,996,198, Cl. 514-157.000.
Hofmann, Fritz-Walter: *See—*
Frank, Richard; and Hofmann, Fritz-Walter, 4,996,414, Cl. 250-213.0VT.
Hofmann, Gudrun: *See—*
Hofmann, Jorg, 4,995,752, Cl. 402-34.000.
Hofmann, Jorg, to Hofmann, Gudrun; and Hofmann, Raimund. Ordering means for document files or the like. 4,995,752, Cl. 402-34.000.
Hofmann, Raimund: *See—*
Hofmann, Jorg, 4,995,752, Cl. 402-34.000.
Hofmeister, Peter: *See—*
Leyendecker, Joachim; Neubauer, Hans-Juergen; Kardorff, Uwe; Kuenast, Christoph; Hofmeister, Peter; and Krieg, Wolfgang, 4,996,216, Cl. 514-338.000.
Hoki, Yoji: *See—*
Watarai, Shinichi; Yasuda, Megumi; Hoki, Yoji; and Inoue, Makoto, 4,996,567, Cl. 355-290.000.
Hokuyo Automatic Company, Ltd.: *See—*
Yamashita, Tsuyoshi; Kobayashi, Goro; Nakamura, Hisanori; Shibata, Youichi; and Mori, Toshihiro, 4,996,683, Cl. 370-4.000.
Hollis Automation, Inc.: *See—*
Lowell, Charles R.; and Sterritt, Janet R., 4,995,411, Cl. 134-198.000.
Hollow, Thomas E. Intrusion deterrent apparatus. 4,996,521, Cl. 340-691.000.
Holtzmann, Hans-Joachim: *See—*
Pietsch, Hanns; Kartheus, Holger; Holtzmann, Hans-Joachim; Sachau, Gunther; and Reul, Helmut, 4,996,054, Cl. 424-422.000.
Homan, Peter C.: *See—*
Johnston, Lonnie E.; and Homan, Peter C., 4,995,646, Cl. 285-137.100.
Homolla, Jurgen: *See—*
Hinrichs, Michael; Homolla, Jurgen; Schormair, Eckart; Czempik, Klaus; and Hornig, Rolf, 4,995,342, Cl. 119-18.000.
Honda Giken Kogyo K.K.: *See—*
Shiraishi, Shuji; Nishihara, Takashi; Kiryu, Hironobu; and Omomo, Naoki, 4,996,657, Cl. 364-559.000.
Honda Giken Kogyo Kabushiki Kaisha: *See—*
Hara, Naoki; and Yamaguchi, Nobuo, 4,995,471, Cl. 180-219.000.
Inagaki, Takashi; Yoshimoto, Tokuji; Okubo, Michio; Okazaki, Kouji; and Ikeda, Tsugio, 4,995,448, Cl. 165-44.000.
Matsuda, Shohei; Suzuki, Jiro; Sato, Tsuyoshi; and Tashima, Kazutoshi, 4,995,677, Cl. 303-113.000.
Morita, Hirobumi; Matsuzaki, Eiichi; Chiba, Yukio; and Kato, Shigeo, 4,995,338, Cl. 118-410.000.
Tamura, Michio; and Furuki, Fumio, 4,995,667, Cl. 296-216.000.
Yamaguchi, Kouji; and Maki, Kazuya, 4,995,470, Cl. 180-197.000.
Honda, Toshio: *See—*
Tanuma, Itsuo; Otsuru, Hiromi; and Honda, Toshio, 4,996,110, Cl. 428-343.000.
Honeywell Inc.: *See—*
Hess, Richard F.; Liebel, Kurt A.; and Yount, Larry J., 4,996,687, Cl. 371-10.100.
Jachimowicz, Karen E.; and Gold, Ronald S., 4,995,718, Cl. 353-31.000.
Lin, Stephen C. Y., 4,996,445, Cl. 307-272.300.
Peczalski, Andrezj; Costa, Julio C.; and Conger, Jeffrey S., 4,996,454, Cl. 307-480.000.
Hong, Ming-Che; Wu, Ching K.; and Lee, Martin. Shoe with detachable toe cover. 4,995,174, Cl. 36-72.00R.
Honma, Toshio: *See—*
Kadowaki, Toshihiro; Ohnishi, Tetsuya; Katoh, Koichi; Suzuki, Yasumichi; and Honma, Toshio, 4,996,591, Cl. 358-80.000.
Honma, Yasushi; Tamaki, Hajime; Magaribuchi, Tetsuo; and Takido, Mine, to Tanabe Seiyaku Company, Ltd. Pyridyl-substituted imidazoles, compositions containing same and methods of use thereof. 4,996,217, Cl. 514-338.000.
Hooke, John A.: *See—*
Entenmann, John K.; Hooke, John A.; Kampmeier, Eric E.; and Posterick, Barry L., 4,996,705, Cl. 379-91.000.
Hoover Group, Inc.: *See—*
Nichols, Dwight E., 4,995,588, Cl. 251-144.000.
Hopkins, Brian M., to Westinghouse Electric Corp. A method of and apparatus for comparing the location of an extended feature within a field of view with a standard location. 4,996,593, Cl. 358-101.000.
Hopkins, Frank: *See—*
Gracey, Michael; Hopkins, Frank; Robinson, Jennifer; and Snow, Stephen, 4,996,232, Cl. 514-474.000.
Horansky, John; and Winalis, Kenneth L., to Chyrsler Corporation. Mounting structure for vehicle bumper assembly. 4,995,660, Cl. 293-132.000.
Horbach, Heinz G.: *See—*
Gruber, Harald; Hinrichsmeyer, Kurt; Horbach, Heinz G.; and Stadler, Ewald E., 4,996,585, Cl. 357-74.000.
Hori, Masayuki: *See—*
Tanaka, Shinichi; Hori, Masayuki; and Tozawa, Noriyoshi, 4,996,572, Cl. 357-23.500.
Hori, Tomoshige; and Itoh, Kensuke, to Snow Brand Milk Products Co., Ltd. Method for measuring heat transfer coefficient and sensor including heat transfer element and thermal insulation element. 4,995,731, Cl. 374-43.000.
Horigome, Tomoki: *See—*
Tazawa, Kenji; Iwata, Akira; Horigome, Tomoki; and Tohda, Hiroyuki, 4,996,132, Cl. 430-286.000.
Horiuchi, Kei: *See—*
Yamashita, Yoshimi; and Horiuchi, Kei, 4,996,700, Cl. 378-145.000.
Horn, Alan S., to Whitby Research, Inc. Method and compositions for treatment of parkinsonism syndrome in mammels. 4,996,226, Cl. 514-438.000.
Hornig, Rolf: *See—*
Hinrichs, Michael; Homolla, Jurgen; Schormair, Eckart; Czempik, Klaus; and Hornig, Rolf, 4,995,342, Cl. 119-18.000.
Horowitz, Jacob: *See—*
Warshaw, Thelma G.; and Horowitz, Jacob, 4,996,046, Cl. 424-78.000.
Horowitz, Victor. Auxiliary lighting system for high intensity discharge lamp. 4,996,463, Cl. 315-250.000.
Horrobin, David F., to Efamol Limited. Method of reducing porphyrin toxicity using fatty acids. 4,996,233, Cl. 514-560.000.
Horvat, David T.: *See—*
Spencer, Kenneth W.; Horvat, David T.; and MacKenzie, Peter A., 4,995,894, Cl. 65-19.000.
Hosaka, Kunio: *See—*
Kimura, Masayuki; Hosaka, Kunio; Takeda, Shigehumi; and Mitsuhashi, Hiroshi, 4,996,331, Cl. 549-229.000.
Hoshiko, Tomonori: *See—*
Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, 4,996,215, Cl. 514-316.000.
Hoshino, Hiroyuki: *See—*
Nakayama, Tomoyuki; Hoshino, Hiroyuki; Ohtani, Hirofumi; and Matsuzaka, Syoji, 4,996,140, Cl. 430-569.000.
Hosiden Electronics Co., Ltd.: *See—*
Toramoto, Hisao, 4,995,836, Cl. 439-675.000.
Hosoya, Nobukazu: *See—*
Hirao, Yoshichika; and Hosoya, Nobukazu, 4,996,596, Cl. 358-158.000.
Hotine, William. Phase modulator circuit for encoding two binary digits per cycle of sine wave carrier. 4,996,503, Cl. 332-104.000.
Hou, Jack. Rocking display assembly. 4,995,845, Cl. 446-325.000.
Houck, Catherine M.: *See—*
Crossway, Anne; and Houck, Catherine M., 4,996,144, Cl. 435-6.000.
Houk, Theodore L.; and Falk, R. Aaron, to Boeing Company, The. Pipelined residue to mixed base converter and base extension processor. 4,996,527, Cl. 341-83.000.
Houlihan, Francis M.; Reichmanis, Elsa; and Thompson, Larry F., to AT&T Bell Laboratories. Radiation sensitive materials and devices made therewith. 4,996,136, Cl. 430-313.000.
Howell, David A.; Hydeman, Jeffrey E.; Slater, Jeffrey L.; Bodnar, Richard J.; Golick, Leonard R.; Sekera, Robert S.; and Roth, Charles H., Jr., to Westinghouse Electric Corp. Apparatus for servicing a jet pump hold down beam in a nuclear reactor. 4,995,158, Cl. 29-723.000.
Hoya Corporation: *See—*
Tachiwana, Kazuo, 4,996,173, Cl. 501-73.000.
Hoyu Bussan Kabushiki Kaisha: *See—*
Tsuruoka, Shigeyoshi; and Hayashi, Saigiro, 4,995,332, Cl. 118-66.000.
Hsieh, Chang-Ming: *See—*
Habitz, Peter A.; Hsieh, Chang-Ming; and Huang, Yi-Shiou, 4,996,164, Cl. 437-31.000.
Hsu, Chin C., to B. F. Goodrich Company, The. Polycarboxylic acids with higher thickening capacity and better clarity. 4,996,274, Cl. 526-208.000.

HTI Technology Canada Ltd.: *See*—
Krynski, Stephen V., 4,995,495, Cl. 196-46.000.
Huang, Steve S.: *See*—
Moslehi, Mehrdad M.; and Huang, Steve S., 4,996,077, Cl. 427-38.000.
Huang, Yi-Shiou: *See*—
Habitz, Peter A.; Hsieh, Chang-Ming; and Huang, Yi-Shiou, 4,996,164, Cl. 437-31.000.
Huang, Yung C. Car mark emblem display and storage device. 4,995,278, Cl. 74-89.150.
Huber, Jakob; and Meier, Wolfgang, to Siemens Aktiengesellschaft. Monolithically integratable microwave attenuation element. 4,996,504, Cl. 333-81.00R.
Hubscher, Josef: *See*—
Barner, Richard; and Hubscher, Josef, 4,996,375, Cl. 568-853.000.
Huckett, Eric P.: *See*—
Dack, David G.; Huckett, Eric P.; and Macintosh, David W., 4,996,695, Cl. 375-10.000.
Hudson, Sharon J., Jr., to Sharon Manufacturing Company. Oil jet piston cooler. 4,995,346, Cl. 123-41.350.
Hughes Aircraft Company: *See*—
Bentley, Robert, 4,996,461, Cl. 315-8.000.
Grubbs, Robert A.; and Brown, Gregory P., 4,996,534, Cl. 342-195.000.
Myers, James R., 4,995,698, Cl. 350-96.290.
Redford, Gary R., 4,996,420, Cl. 250-227.240.
Huhn, James M.: *See*—
Norlien, John A.; Huhn, James M.; and Crawford, A. Gerrit, 4,995,256, Cl. 73-31.040.
Huit Gesellschaft Fur-Hydrid-Und Wasserstofftechnik m.b.H.: *See*—
Halene, Clemens, 4,995,235, Cl. 62-46.200.
Hull, Harold L.: *See*—
Montgomery, Robert D.; and Hull, Harold L., 4,995,128, Cl. 7-127.000.
Hull, Roger: *See*—
Al-Hakim, Ali H.; and Hull, Roger, 4,996,142, Cl. 435-6.000.
Hume, Graeme R. Method for rapid molding of elongate concrete articles. 4,996,013, Cl. 264-86.000.
Humphrey, William D.; and Rothenberger, Harold. Retaining lock for chain link fence slats. 4,995,591, Cl. 256-34.000.
Hunter, Kent. Mono-ski deep side cuts for user stability control. 4,995,631, Cl. 280-607.000.
Hurner, Erwin E. Apparatus for heating and demoisturizing diesel fuel. 4,995,992, Cl. 210-803.000.
Huth, Ronald G.: *See*—
Kennedy, Lawrence C.; and Huth, Ronald G., 4,995,494, Cl. 192-58.00B.
Hwang, Kuo H. Shuttlecock. 4,995,619, Cl. 273-417.000.
Hwang, Woo-hyun: *See*—
Kim, Dae-il; and Hwang, Woo-hyun, 4,996,460, Cl. 313-586.000.
Hwang, Yin Teh. Balance type minute lengthenable adjuster. 4,995,847, Cl. 450-71.000.
Hydac Technology GMBH: *See*—
Gensberger, Karl; and Morsch, Joachim, 4,995,586, Cl. 251-30.040.
Hydeman, Jeffrey E.: *See*—
Howell, David A.; Hydeman, Jeffrey E.; Slater, Jeffrey L.; Bodnar, Richard J.; Golick, Leonard R.; Sekera, Robert S.; and Roth, Charles H., Jr., 4,995,158, Cl. 29-723.000.
Hydrofoil International, Inc.: *See*—
Seale, Robert; Rizzuto, Dennis; and Satin, Harold, 4,995,840, Cl. 440-66.000.
Hyodo, Kenji: *See*—
Otani, Masaaki; Hiraishi, Shigetoshi; and Hyodo, Kenji, 4,996,183, Cl. 503-208.000.
Hyodo, Youichi; Muramatsu, Tadao; and Hattori, Takaji, to Toyota Jishoda Kabushiki Kaisha. Ball joint. 4,995,755, Cl. 403-133.000.
HyperPower, Inc.: *See*—
Traxler, John C., 4,996,407, Cl. 219-121.540.
IBV, Firma: *See*—
Ofner, Maximilian, 4,995,966, Cl. 209-240.000.
Ic, Andre : *See*—
Rouquier, Pierre; Pele, Michel; Ic, Andre ; and Crestey, Pierre, 4,995,236, Cl. 62-51.100.
Ichihashi, Hiroo: *See*—
Kawai, Tatsundo; Ogura, Makoto; Tomoda, Koji; Ichihashi, Hiroo; Seitoh, Shinichi; Kuroda, Yasuo; and Noguchi, Hiroyuki, 4,996,606, Cl. 358-475.000.
Ichinose, Hisao; Takeda, Yoshimitsu; Sato, Tsuyoshi; and Imai, Hiroshi, to Nissan Motor Company, Ltd.; and Johnan Seisakusho Co., Ltd. Sunroof structure for motor vehicle. 4,995,665, Cl. 296-213.000.
Ickes, William G.: *See*—
Pink, William B.; and Ickes, William G., 4,995,808, Cl. 432-72.000.
Idemitsu Kosan Company Limited: *See*—
Maezawa, Hiroshi; and Tomotsu, Norio, 4,996,338, Cl. 556-179.000.
Iga, Yoshiro: *See*—
Tsukada, Minoru; Tanaka, Kenji; and Iga, Yoshiro, 4,996,050, Cl. 424-94.200.
Iida, Yoshikazu: *See*—
Matsui, Hideki; Hagiuda, Nobuyoshi; Yokonuma, Norikazu; Sakamoto, Hiroshi; and Iida, Yoshikazu, 4,996,550, Cl. 354-420.000.
Iino, Yoshiki: *See*—
Nishida, Yasuaki; Iino, Yoshiki; Ohtake, Hiroshi; Abe, Masahide; Yoshikawa, Shigeo; Endo, Yukio; Matsunaga, Yoshiyuki; and Harada, Nozomu, 4,996,600, Cl. 358-213.220.
Ikeda, Toshimichi: *See*—
Imai, Kuninori; Shiokawa, Takeji; Kato, Shigeo; Ishikawa, Isao; Ikeda, Toshimichi; and Otake, Kan, 4,995,711, Cl. 350-529.000.
Ikeda, Tsugio: *See*—
Inagaki, Takashi; Yoshimoto, Tokuji; Okubo, Michio; Okazaki, Kouji; and Ikeda, Tsugio, 4,995,448, Cl. 165-44.000.
Ikenoue, Yoshikazu: *See*—
Kamei, Nobuo; and Ikenoue, Yoshikazu, 4,996,649, Cl. 364-518.000.
ILB Co., Ltd.: *See*—
Yoshida, Kinoto; Fujii, Morizumi; Tsuda, Tokihiro; Suda, Shigeo; Kodama, Osamu; Kuroe, Kazuro; Tanikawa, Takumi; Nishimura, Michihiko; and Munakata, Hideyuki, 4,995,932, Cl. 156-242.000.
Ilchishin, Andrei P.: *See*—
Paton, Boris E.; Vasiliev, Vsevolod V.; Bogdanovsky, Valentin A.; Sheiekhov, Konstantin V.; Gavva, Viktor M.; Bigdash, Vladimir D.; Tabunschik, Ivan A.; and Ilchishin, Andrei P., 4,996,409, Cl. 219-130.010.
Ilford Limited: *See*—
Ficken, Geoffrey E.; Edwards, Douglas J.; Mowforth, Clive W.; Maternaghan, Trevor J.; Steiger, Rolf; and Dolden, Victor W., 4,996,141, Cl. 430-583.000.
Illinois Tool Works, Inc.: *See*—
Lasley, Charles T.; and Gimple, James J., 4,995,560, Cl. 239-708.000.
Ilmoniemi, Risto; and Ahlfors, Seppo, to Neuromag OY. Method and apparatus for location finding of electrodes placed onto the body, particularly to the head. 4,995,395, Cl. 128-653.00R.
Imaeda, Hirofumi; and Hakamata, Kyoji, to Sanshin Kogyo Kabushika Kaisha. Linked operating device for multiple carburetors. 4,995,370, Cl. 123-583.000.
Imai, Hiroshi: *See*—
Ichinose, Hisao; Takeda, Yoshimitsu; Sato, Tsuyoshi; and Imai, Hiroshi, 4,995,665, Cl. 296-213.000.
Imai, Kuninori; Shiokawa, Takeji; Kato, Shigeo; Ishikawa, Isao; Ikeda, Toshimichi; and Otake, Kan, to Hitachi, Ltd.; and Hitachi Construction Machinery Co., Ltd. Slide table. 4,995,711, Cl. 350-529.000.
Imai, Shin-ichi; and Yoshie, Tatsuya, to Kabushiki Kaisha Toshiba. Charge transfer device with reset voltage generating circuit. 4,996,686, Cl. 377-60.000.
Imbt, John H.: *See*—
Weaver, Robert C.; and Semion, Robert, 4,995,663, Cl. 296-100.000.
Imed Corporation: *See*—
Bartholomew, Victor L.; and di Palma, Giorgio, 4,995,864, Cl. 604-153.000.
Imo Industries, Inc.: *See*—
Krupa, Robert J.; and Owen, R. Calvin, 4,995,721, Cl. 356-305.000.
Smith, Ronald J., 4,996,396, Cl. 200-81.90M.
Imperato, John L.: *See*—
Larson, Ronald K.; and Imperato, John L., 4,996,500, Cl. 330-279.000.
Imperial Chemical Industries Plc: *See*—
Birchall, James D.; Mockford, Mary J.; and Stanley, David R., 4,996,174, Cl. 501-87.000.
Denny, Patrick J.; and Wood, Peter, 4,996,181, Cl. 502-414.000.
Eling, Berend; and Tweedale, Colin R., 4,996,241, Cl. 521-107.000.
IMTA: *See*—
Bonomi, Giovanni B.; and Oldani, Battistino, 4,995,148, Cl. 29-26.00A.
INA Walzlager Schaeffler KG: *See*—
Haase, Henry; Schneider, Joachim; and Alber, Pierre, 4,995,736, Cl. 384-448.000.
Inaba, Makoto; Hayashi, Masaaki; Hashiguchi, Toshihiko; Hibino, Hiroki; Sasa, Hiroyuki; Barlow, David E.; Ohshima, Yutaka; Ishihara, Kohichiro; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Klosterman, Frank; and Goodman, Jack, to Olympus Optical Co., Ltd. Radioactive ray detecting endoscope. 4,995,396, Cl. 128-654.000.
Inaba, Masahito: *See*—
Kawagoe, Nobukazu; Sugiyama, Masami; and Inaba, Masahito, 4,995,727, Cl. 356-402.000.
Inaba, Yoshihiro: *See*—
Koshizuka, Kunihiro; Abe, Takao; Maehashi, Tatsuichi; and Inaba, Yoshihiro, 4,996,093, Cl. 428-212.000.
Inaga, Hisashi: *See*—
Kumagai, Seiichiro; Kono, Michikata; Okai, Masakazu; and Inaga, Hisashi, 4,995,350, Cl. 123-65.0VC.
Inagaki, Hiroyuki: *See*—
Sasaki, Hirotaka; Tanaka, Aguri; Inagaki, Hiroyuki; Suzuki, Tatsuo; and Asakura, Kenji, 4,995,871, Cl. 604-110.000.
Inagaki, Jitsuo. Bed pad, an automobile seat pad, a pillow or a similar cushionlike item. 4,995,127, Cl. 5-461.000.
Inagaki, Takashi; Yoshimoto, Tokuji; Okubo, Michio; Okazaki, Kouji; and Ikeda, Tsugio, to Honda Giken Kogyo Kabushiki Kaisha. Engine oil cooling system. 4,995,448, Cl. 165-44.000.
Inamura, Susumu: *See*—
Udagawa, Tsunekazu; and Inamura, Susumu, 4,995,624, Cl. 277-235.00B.
Inax Corporation: *See*—
Yoshida, Kinoto; Fujii, Morizumi; Tsuda, Tokihiro; Suda, Shigeo; Kodama, Osamu; Kuroe, Kazuro; Tanikawa, Takumi; Nishimura, Michihiko; and Munakata, Hideyuki, 4,995,932, Cl. 156-242.000.

Inco Limited: *See—*
Eerkes, Thijs; Diaz, Carlos M.; and Bell, James A. E., 4,996,115, Cl. 428-614.000.
Indak Manufacturing Corp.: *See—*
Cummings, John G., 4,996,394, Cl. 200-5.00E.
Ing. C. Olivetti & C., S.p.A.: *See—*
Bernardis, Francesco; Marangon, Claudio; and Ferrarotti, Rinaldo, 4,995,743, Cl. 400-124.000.
Ingham, Peter L., to Dunlop Limited. Resilient mounting. 4,995,598, Cl. 267-293.000.
Inglett, George F., to United States of America, Agriculture. Method for making a soluble dietary fiber composition from oats. 4,996,063, Cl. 426-21.000.
Injectall Limited: *See—*
Thrower, Anthony; and Bates, Kenneth W., 4,995,270, Cl. 73-863.850.
Innovative Solutions & Support, Incorporated: *See—*
Hedrick, Geoffrey S. M., 4,996,656, Cl. 364-558.000.
Inohara, Kazumi: *See—*
Sakata, Isao; Nakajima, Susumu; Koshimizu, Koichi; Samejima, Natsuki; Inohara, Kazumi; Takata, Hiroyuki; Yamauchi, Hirohiko; Ueda, Nobuo; and Hazue, Masaaki, 4,996,312, Cl. 540-145.000.
Inomata, Hiroshi; Kishita, Hirofumi; and Yoshida, Akira, to Shin-Etsu Chemical Co., Ltd. Fluorine-containing organosilicon compound and process for preparing the same. 4,996,344, Cl. 556-448.000.
Inoue, Fukashi: *See—*
Okamoto, Toshikazu; and Inoue, Fukashi, 4,996,590, Cl. 358-74.000.
Inoue, Makoto: *See—*
Watarai, Shinichi; Yasuda, Megumi; Hoki, Yoji; and Inoue, Makoto, 4,996,567, Cl. 355-290.000.
Inoue, Noriyuki; Hirano, Katsumi; and Saitou, Mitsuo, to Fuji Photo Film Co., Ltd. Method for forming a direct positive image. 4,996,137, Cl. 430-378.000.
Inoue, Shigeru: *See—*
Iwasaki, Katsuhiro; Takahashi, Kenji; Inoue, Shigeru; Tanabe, Haruyoshi; Kawakami, Masahiro; and Terada, Osamu, 4,995,906, Cl. 75-502.000.
Insight Media, Inc.: *See—*
Landry, John C.; and Bourque, Michael R., 4,995,641, Cl. 283-67.000.
Institut Francais du Petrole: *See—*
Beauducel, Claude, 4,996,675, Cl. 367-162.000.
Interface Research Corporation: *See—*
McIntosh, Robert H., 4,996,052, Cl. 424-404.000.
International Business Machines Corporation: *See—*
Aoyagi, Akihiko; Endo, Tatsuya; and Terashima, Hiroshi, 4,996,616, Cl. 360-104.000.
Beacom, Thomas J.; and Freerksen, Donald L., 4,996,660, Cl. 364-748.000.
Butler, Nicholas D.; Gay, Adrian C.; and Bresenham, Jack E., 4,996,653, Cl. 364-521.000.
Christiansen, Robert A.; and DiGirolamo, Joel A., 4,996,629, Cl. 361-400.000.
Ciraula, Michael K.; Durham, Christopher M.; and Jallice, Derwin L., 4,996,670, Cl. 365-200.000.
David, Lawrence D., 4,995,942, Cl. 156-642.000.
Erpelding, A. David; Palmer, Darrell D.; and Wilmer, Richard K., 4,996,623, Cl. 360-104.000.
Goldowsky, Michael P.; Hisano, Teiji; Karidis, John P.; Shibuya, Hiromi; and Ueda, Osamu, 4,995,744, Cl. 400-157.200.
Gruber, Harald; Hinrichsmeyer, Kurt; Horbach, Heinz G.; and Stadler, Ewald E., 4,996,585, Cl. 357-74.000.
Habitz, Peter A.; Hsieh, Chang-Ming; and Huang, Yi-Shiou, 4,996,164, Cl. 437-31.000.
Hinrichsmeyer, Kurt; Straehle, Werner; Kelley, Gordon A., Jr.; and Noth, Richard W., 4,996,587, Cl. 357-74.000.
McSparran, Ray A.; Moore, William S.; and Wooden, James R., 4,996,487, Cl. 324-549.000.
International Flavors & Fragrances, Inc.: *See—*
Kossiakoff, Nicolas; and Augis, Daniel, 4,995,407, Cl. 131-359.000.
International Mobile Machines Corporation: *See—*
Critchlow, David N.; Avis, Graham M.; Earlam, Sandra J. K.; Johnson, Karle J.; Smetana, Bruce A.; Westling, Gregory L.; Paneth, Eric; and Yehushua, Moshe, 4,996,697, Cl. 375-104.000.
International Paper Company: *See—*
Siegel, Jodie M.; Sternlieb, Herschel; Connolly, Timothy J.; Greenway, J. Michael; Parker, D. A.; and Simon, Arlene T., 4,995,151, Cl. 26-69.00R.
International Rectifier Corporation: *See—*
Kinzer, Daniel M., 4,996,577, Cl. 357-30.000.
International Superconductor Corp.: *See—*
Hed, Aharon Z., 4,996,508, Cl. 335-216.000.
Inujima, Takashi; Yamazaki, Shunpei; Konuma, Toshimitsu; Hamatani, Toshiji; Sakama, Mitsunori; Yamaguchi, Toshiharu; and Kobayashi, Ippei, to Semiconductor Energy Laboratory Co., Ltd. Liquid crystal device with a ferroelectric thin film. 4,995,706, Cl. 350-350.00S.
Iny, Oliver: *See—*
Bhagwat, Dileep; Iny, Oliver; and Pedi, Frank, Jr., 4,996,048, Cl. 424-80.000.
Iovine, Carmine: *See—*
Leighton, John; and Iovine, Carmine, 4,996,045, Cl. 424-70.000.
Ipri, Alfred C.; and Napoli, Louis S., to David Sarnoff Research Center, Inc. Low leakage silicon-on-insulator CMOS structure and method of making same. 4,996,575, Cl. 357-23.700.
Isaacs, Neil S.: *See—*
Bottenbruch, Ludwig; Ruppert, Heinrich; Isaacs, Neil S.; and Latham, Kenneth G., 4,996,373, Cl. 568-727.000.
Isaka, Tsutomu: *See—*
Yoshinaka, Yasuo; Kuze, Katsuaki; Isaka, Tsutomu; Yamashita, Toshihiro; Matsuyama, Yujiro; Nakamura, Koichiro; Matsunaga, Tsuyoshi; and Makimura, Osamu, 4,996,291, Cl. 528-272.000.
Ishida, Nobuji: *See—*
Takahashi, Yoshio; Sudo, Mitsuo; Arikawa, Takamasa; Nakamura, Kenji; Sato, Izumi; Onogi, Katsuyuki; Iura, Takao; and Ishida, Nobuji, 4,995,505, Cl. 198-468.400.
Ishihara, Kohichiro: *See—*
Inaba, Makoto; Hayashi, Masaaki; Hashiguchi, Toshihiko; Hibino, Hiroki; Sasa, Hiroyuki; Barlow, David E.; Ohshima, Yutaka; Ishihara, Kohichiro; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Klosterman, Frank; and Goodman, Jack, 4,995,396, Cl. 128-654.000.
Ishihara Sangyo Kaisha, Ltd.: *See—*
Nasu, Rikuo; Komyoji, Terumasa; Nakajima, Toshio; Suzuki, Kazumi; Ito, Keiichiro; Oshima, Takeshi; and Yoshimura, Hideshi, 4,995,898, Cl. 71-90.000.
Ishii, Kazuo: *See—*
Kato, Eiichi; and Ishii, Kazuo, 4,996,121, Cl. 430-87.000.
Ishii, Mitsuaki: *See—*
Fukuchi, Hiroshi; Ishii, Mitsuaki; and Miyazaki, Masaaki, 4,996,644, Cl. 364-431.050.
Ishii, Mitsuo: *See—*
Nagai, Seiichi; Ishii, Mitsuo; and Hasegawa, Kazuyoshi, 4,995,687, Cl. 350-96.200.
Ishii, Shoju, to Rhythm Motor Parts Mfg., Co., Ltd. Ball-and-socket joint. 4,995,754, Cl. 403-132.000.
Ishikawa Gasket Co., Ltd.: *See—*
Udagawa, Tsunekazu; and Inamura, Susumu, 4,995,624, Cl. 277-235.00B.
Ishikawa, Isao: *See—*
Imai, Kuninori; Shiokawa, Takeji; Kato, Shigeo; Ishikawa, Isao; Ikeda, Toshimichi; and Otake, Kan, 4,995,711, Cl. 350-529.000.
Ishikawa, Kiyomitsu: *See—*
Okazaki, Kunio; and Ishikawa, Kiyomitsu, 4,996,719, Cl. 455-606.000.
Tanaka, Hirokazu; Ishikawa, Kiyomitsu; and Tanabe, Tohru, 4,996,415, Cl. 250-221.000.
Ishikawa, Sadahito: *See—*
Tokuhiro, Tomoya; Koibuchi, Nobutaka; Miyauchi, Teruhiko; Kikuchi, Koshin; Hirokawa, Jun; Yamashiro, Kunio; Nishizuka, Sakae; Watanabe, Ippei; Maruo, Shozo; Tsutsui, Yohichiro; and Ishikawa, Sadahito, 4,995,765, Cl. 406-117.000.
Ishikawa, Susumu: *See—*
Naya, Masaru; Kuzumaki, Masayuki; and Ishikawa, Susumu, 4,995,311, Cl. 99-295.000.
Ishikawa, Youhei; Hiratsuka, Toshiro; Abe, Hirotsugu; Takagaki, Hisashi; and Yamashita, Sadao, to Murata Manufacturing Co., Ltd. Band elimination filter and dielectric resonator therefor. 4,996,506, Cl. 333-219.100.
Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See—*
Takahashi, Yoshio; Sudo, Mitsuo; Arikawa, Takamasa; Nakamura, Kenji; Sato, Izumi; Onogi, Katsuyuki; Iura, Takao; and Ishida, Nobuji, 4,995,505, Cl. 198-468.400.
Ishikura, Tomoyuki: *See—*
Yoshioka, Takeo; Chida, Noritaka; Watanabe, Azuma; Fukagawa, Yasuo; and Ishikura, Tomoyuki, 4,996,314, Cl. 540-364.000.
Ishimoto, Satomi; Matsushima, Osamu; and Sakuma, Hajime, to NEC Corporation. Data processor including an A/D converter for converting a plurality of analog input channels into digital data. 4,996,639, Cl. 364-200.000.
Ishino, Takashi; Hiyama, Isao; Nagano, Yousuke; Shikamori, Tamotu; Turuta, Shizuo; Kamano, Toshiyasu; and Ohsugi, Hiroshi, to Hitachi, Ltd. Washing machine. 4,995,247, Cl. 68-12.00R.
Islam, Mohammed N. Modulation instability-based fiber interferometric switch. 4,995,690, Cl. 350-96.150.
Isogai, Toshiyuki: *See—*
Shirai, Noboru; and Isogai, Toshiyuki, 4,995,674, Cl. 301-37.00P.
Isomura, Satoru: *See—*
Aonuma, Mitsuyoshi; Suzuki, Tatsunosuke; Isomura, Satoru; and Nishimura, Koichi, 4,996,264, Cl. 525-179.000.
Isuzu Motors Limited: *See—*
Adachi, Toshiaki, 4,995,360, Cl. 123-262.000.
Itai, Kosaku, to Mitsubishi Denki Kabushiki Kaisha. Gas insulated switch device. 4,996,485, Cl. 324-415.000.
Ito, Keiichiro: *See—*
Nasu, Rikuo; Komyoji, Terumasa; Nakajima, Toshio; Suzuki, Kazumi; Ito, Keiichiro; Oshima, Takeshi; and Yoshimura, Hideshi, 4,995,898, Cl. 71-90.000.
Ito, Masahiro, to Kabushiki Kaisha Toshiba. Tape position data indicating apparatus for cassette tape player. 4,996,611, Cl. 360-72.300.
Ito, Nobuo: *See—*
Hirai, Kiyomiki; Takeuchi, Koji; Ito, Nobuo; and Abe, Masahiro, 4,996,286, Cl. 528-123.000.
Itoh, Hiroshi: *See—*
Takada, Mitsuru; Itoh, Hiroshi; Takahashi, Tokuyuki; and Funahashi, Makoto, 4,995,284, Cl. 74-868.000.
Itoh, Kenji, to Semiconductor Energy Laboratory Co., Ltd. Method of depositing thin films consisting mainly of carbon. 4,996,079, Cl. 427-39.000.
Itoh, Kensuke: *See—*
Hori, Tomoshige; and Itoh, Kensuke, 4,995,731, Cl. 374-43.000.

Itoh, Teruyuki: *See*—
Yokoyama, Junichi; Urushihara, Tomonori; Itoh, Teruyuki; and Fujii, Hiroyuki, 4,995,359, Cl. 123-188.00M.
Itoi, Hiroshi; Sano, Hiroshi; and Shibasaki, Kenichiro, to Lion Corporation. Preparation of water-soluble acylated chitosan. 4,996,307, Cl. 536-20.000.
Itozaki, Hideo: *See*—
Higaki, Kenjiro; Harada, Keizo; Fujimori, Naoji; Itozaki, Hideo; and Yazu, Shuji, 4,996,190, Cl. 505-1.000.
ITT Corporation: *See*—
Balyasny, Marik; and Baldwin, Kenneth B., 4,996,476, Cl. 324-158.00F.
Goodman, David S.; and Rudoy, Edward, 4,995,828, Cl. 439-405.000.
Rudoy, Edward, 4,995,827, Cl. 439-405.000.
Ittemann, Peter: *See*—
Gerth, Dale; Ittemann, Peter; and Tesch, Helmut, 4,996,267, Cl. 525-423.000.
Iuchi, Shinichiro: *See*—
Saito, Osamu; Kamezaki, Hisamitsu; Suenaga, Masashi; Nagai, Ryo; Iuchi, Shinichiro; Watanabe, Hitoshi; and Fujiwara, Hideo, 4,996,089, Cl. 428-64.000.
Iura, Takao: *See*—
Takahashi, Yoshio; Sudo, Mitsuo; Arikawa, Takamasa; Nakamura, Kenji; Sato, Izumi; Onogi, Katsuyuki; Iura, Takao; and Ishida, Nobuji, 4,995,505, Cl. 198-468.400.
Iwahara, Takahisa; and West, Robert C., to Kanegafuchi Chemical Industry Co., Ltd. Condensed bicyclic disilanylene-acetylene compound and method for preparing the same. 4,996,341, Cl. 556-406.000.
Iwamoto, Katsuharu; Kawakami, Osamu; and Miyagawa, Hideo, to Kabushiki Kaisha Toshiba. Wide range fiber optical displacement sensor. 4,996,418, Cl. 250-227.110.
Iwamoto, Toshikazu: *See*—
Hattori, Atsushi; Hanajima, Mabito; Moriyasu, Masaharu; Iwamoto, Toshikazu; and Matsumoto, Kazuhiko, 4,996,458, Cl. 313-402.000.
Iwanaga, Atsushi, to Alps Electric Co., Ltd. Head assembly. 4,996,615, Cl. 360-104.000.
Iwanaga, Shin-ichiro: *See*—
Enyo, Hiroji; Iwanaga, Shin-ichiro; and Takemura, Yasuhiko, 4,996,134, Cl. 430-286.000.
Iwanaga, Teruo: *See*—
Kisima, Yoshio; Iwanaga, Teruo; and Goto, Hitoshi, 4,995,273, Cl. 73-865.600.
Iwasaki, Katsuhiro; Takahashi, Kenji; Inoue, Shigeru; Tanabe, Haruyoshi; Kawakami, Masahiro; and Terada, Osamu, to NKK Corporation. Method for smelting reduction of iron ore. 4,995,906, Cl. 75-502.000.
Iwasaki, Masami: *See*—
Matsuda, Hideo; Fujiwara, Takashi; Yokota, Yoshio; Kitagawa, Mitsuhiko; Iwasaki, Masami; and Watanuki, Kazuo, 4,996,586, Cl. 357-74.000.
Iwata, Akira: *See*—
Tazawa, Kenji; Iwata, Akira; Horigome, Tomoki; and Tohda, Hiroyuki, 4,996,132, Cl. 430-286.000.
Iwata, Kazuo; Satou, Takuma; and Shibata, Satoru, to Mitsubishi Denki Kabushiki Kaisha. Optical collimator. 4,995,709, Cl. 350-447.000.
Jablonski, Edward J.: *See*—
Heller, Michael J.; and Jablonski, Edward J., 4,996,143, Cl. 435-6.000.
Jachimowicz, Karen E.; and Gold, Ronald S., to Honeywell Inc. Full color three-dimensional projection display. 4,995,718, Cl. 353-31.000.
Jackson, Bert W. Heat exchange pipes for a furnace system. 4,995,375, Cl. 126-85.00B.
Jackson, Roy J., to Bullock Mfg. Pty. Ltd. Locking flange clip. 4,995,648, Cl. 285-406.000.
Jacobsen, Stephen C.; and Wood, John E., to Sarcos Group. Field-based movement sensing apparatus. 4,995,261, Cl. 73-767.000.
Jacquot, William E.; Tettman, Richard L.; and Davis, Melvin D., to Western Temco, Inc. Unitary water cooler filter. 4,995,975, Cl. 210-266.000.
Jaguar Cars Limited: *See*—
Parsons, Bryan N. V., 4,995,279, Cl. 74-199.000.
Jahr, Wolfgang: *See*—
Appl, Herbert; Gnann, Michael; Jahr, Wolfgang; and Rossberger, Erwin, 4,995,550, Cl. 228-175.000.
Jaico C.V., Cooperatieve Vennootschap: *See*—
Vandoninck, Alfons, 4,995,533, Cl. 222-54.000.
Jallice, Derwin L.: *See*—
Ciraula, Michael K.; Durham, Christopher M.; and Jallice, Derwin L., 4,996,670, Cl. 365-200.000.
James, Brian R.: *See*—
Cullen, William R.; Fryzuk, Michael D.; James, Brian R.; Kang, Guo-Jun; Kutney, James P.; Spogliarich, Roberto; and Thorburn, Ian S., 4,996,361, Cl. 564-304.000.
James River II, Inc.: *See*—
Dew, Jimmy S., 4,996,096, Cl. 428-216.000.
Jameson, Ronald F.: *See*—
Abrams, Lionel; Fisher, Arthur; and Jameson, Ronald F., 4,995,337, Cl. 119-18.000.
Janatka, Karel, to Pitney Bowes Inc. Wicking apparatus for envelopes. 4,995,934, Cl. 156-441.500.
Janz, Ronald J.: *See*—
Schantz, Spencer; Janz, Ronald J.; Christiansen, Gary; and Sager, Steven, 4,995,650, Cl. 292-201.000.
Japan Pionics, Ltd.: *See*—
Kitahara, Koichi; Shimada, Takashi; Akita, Noboru; Hiramoto, Tadashi; and Sasaki, Kohhei, 4,996,030, Cl. 423-210.000.
Japan Synthetic Rubber Co., Ltd.: *See*—
Enyo, Hiroji; Iwanaga, Shin-ichiro; and Takemura, Yasuhiko, 4,996,134, Cl. 430-286.000.
Jarosch, George W.: *See*—
Barthel, Richard C.; Malone, Peter J.; Orth, Charles D.; and Jarosch, George W., 4,995,240, Cl. 62-225.000.
Jarreau, Francois X.; Azerad, Robert G.; and Ogerau, Thierry P., to Nativelle S.A. Microbiological hydroxylation process of quinine, quinidine and derivatives thereof. 4,996,149, Cl. 435-119.000.
Jarrold, Gregory S.: *See*—
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 4,996,003, Cl. 252-301.40F.
Jaubert, Jean M. System for biological purification of water containing organic materials and derivative products. 4,995,980, Cl. 210-602.000.
Jaynes, Alan, to Chrysler Corporation. Secondary air filter assembly. 4,995,891, Cl. 55-419.000.
JC Technology, Inc.: *See*—
Gardner-Chavis, Ralph A.; and May, Michael P., 4,996,033, Cl. 423-249.000.
Jeanquart, Jeffrey J.: *See*—
Keller, Richard F.; Springer, Terry L.; and Jeanquart, Jeffrey J., 4,995,333, Cl. 118-300.000.
Jeffers, Walter L., Sr. Seed planting apparatus. 4,995,327, Cl. 111-82.000.
Jenkins, Michael S.; Simpson, Andrew F.; and Porter, David A., to Pilkington plc. Method of making coatings on glass surfaces. 4,995,893, Cl. 65-18.200.
Jensen, Ole J.; and Melberg, Steen G., to Radiometer A/S. Electrode device. 4,995,391, Cl. 128-635.000.
JEOL Ltd.: *See*—
Fujito, Teruaki, 4,996,482, Cl. 324-318.000.
Jidosha Kiki Co., Ltd.: *See*—
Ohsakai, Hiroshi, 4,995,970, Cl. 210-167.000.
Jidosha Kiki Co., Ltd: *See*—
Suzuki, Haruo; and Satoh, Atushi, 4,995,302, Cl. 91-369.300.
Jinkens, Joseph A., to Matsuhita Electric Industrial Co., Ltd. Protected pin retention device for crawler track assembly. 4,995,678, Cl. 305-58.00R.
Jinotti, Walter J. Dual-purpose catheter. 4,995,387, Cl. 128-205.240.
Joannou, Kyriacos, to Pericomp Corporation. Magnetic head recording multitrack servo patterns. 4,996,609, Cl. 360-57.000.
Jodai, Tetsuji: *See*—
Fujimori, Naoji; Harada, Keizo; Yazu, Shuji; and Jodai, Tetsuji, 4,996,185, Cl. 505-1.000.
Johnan Seisakusho Co., Ltd.: *See*—
Ichinose, Hisao; Takeda, Yoshimitsu; Sato, Tsuyoshi; and Imai, Hiroshi, 4,995,665, Cl. 296-213.000.
Johns Hopkins University, The: *See*—
Glaser, Bert M., 4,996,159, Cl. 435-70.300.
Johnson, Calvin K.; Cooke, Richard C.; and Tse, Kwok-Tuen, to Acme Resin Corporation. Method to improve flowability of resin coated sand. 4,996,249, Cl. 523-144.000.
Johnson, Donald L.: *See*—
McDaniel, Robert S., Jr.; and Johnson, Donald L., 4,996,306, Cl. 536-18.600.
Johnson Electric S.A.: *See*—
Strobl, Georg, 4,996,456, Cl. 310-261.000.
Johnson, Joe F.: *See*—
Chadwick, Gary L.; and Johnson, Joe F., 4,996,655, Cl. 364-550.000.
Johnson, John A.: *See*—
Deason, Vance A.; Johnson, John A.; and Telschow, Kenneth L., 4,995,260, Cl. 73-632.000.
Johnson, Karle J.: *See*—
Critchlow, David N.; Avis, Graham M.; Earlam, Sandra J. K.; Johnson, Karle J.; Smetana, Bruce A.; Westling, Gregory L.; Paneth, Eric; and Yehushua, Moshe, 4,996,697, Cl. 375-104.000.
Johnson Matthey Public Limited Company: *See*—
Davey, Nigel M.; and Ferrier, Gordon G., 4,996,171, Cl. 501-19.000.
Diwell, Alan F.; Hallett, Christopher; Ansell, Graham; and Hayes, John W., 4,996,180, Cl. 502-304.000.
Johnson, Thomas R.: *See*—
Gahara, William J.; and Johnson, Thomas R., 4,995,865, Cl. 604-43.000.
Johnson, Wayne A.: *See*—
Anton, Mark A.; Steinman, Jory A.; Suek, Paul A.; and Johnson, Wayne A., 4,995,688, Cl. 350-96.100.
Johnson, William H.: *See*—
Handa, Balraj K.; Johnson, William H.; and Machin, Peter J., 4,996,358, Cl. 562-621.000.
Johnston, Albert D.: *See*—
Lederman, Frederick E.; and Johnston, Albert D., 4,995,489, Cl. 192-45.000.
Johnston, Lonnie E.; and Homan, Peter C., to Crawford Fitting Company. Connector for multiple lines. 4,995,646, Cl. 285-137.100.
Jois, Yajnanarayana H. R.: *See*—
Gibson, Harry W.; and Jois, Yajnanarayana H. R., 4,996,346, Cl. 558-392.000.
Jolly, Mark; Negaty-Hindi, Guy; and Haour, Georges, to Battelle Memorial Institute. Method for producing metal or alloy casting composites reinforced with fibrous or particulate materials. 4,995,444, Cl. 164-97.000.

Jones, Joseph S.; and Swann, Peter R., to Gatan, Inc. Specimen heating holder for electron microscopes. 4,996,433, Cl. 250-443.100.
Jongenburger, Peter, to Asea Brown Boveri Ltd. Oxide-dispersion-hardened superalloy based on nickel. 4,995,922, Cl. 148-428.000.
Joseph, Eugene G.: *See—*
Bronn, William R.; Silver, Spencer F.; and Joseph, Eugene G., 4,996,266, Cl. 525-271.000.
Joung, John J.; Akin, Cavit; and Royer, Garfield P., to Amoco Corporation. Biocatalyst immobilization in a gel of anionic polysaccharide and cationic polymer. 4,996,150, Cl. 435-161.000.
Jourjine, Alexander N. Neural network using random binary code. 4,996,648, Cl. 364-513.000.
Juers, Daniel F., to Du Pont de Nemours, E. I., and Company. Low wash water silver halide film processor. 4,995,913, Cl. 134-13.000.
Juki Corporation: *See—*
Shindo, Norikazu; Sekine, Tomoyuki; Nakamura, Yoshikatsu; and Kawamoto, Takashi, 4,996,022, Cl. 419-2.000.
Jung, Dick Y.: *See—*
Beaupre, Richard F.; and Jung, Dick Y., 4,995,888, Cl. 55-16.000.
Juridical Foundation The Chemo-Sero-Therapeutic Research Institute: *See—*
Ginnaga, Akihiro; Morokuma, Kazunori; Aihara, Katsutoshi; and Sakoh, Mitsuo, 4,996,299, Cl. 530-409.000.
Juszak, Joseph J.; and Poplawski, John R., to Wallace Computer Services, Inc. Pocket label for shipping package and method of making. 4,995,642, Cl. 283-105.000.
Kabacoff, Lawrence T., to United States of America, Navy. Laser communication system with wide band magnetrostrictive modulation. 4,996,692, Cl. 372-26.000.
Kabushiki Kaisha ALPS Tool: *See—*
Arisaka, Tomokichi; and Yamaguchi, Mitsuyoshi, 4,995,298, Cl. 82-127.000.
Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo: *See—*
Mitsuhashi, Masakazu; Sakai, Shuzo; and Miyake, Toshio, 4,996,196, Cl. 514-53.000.
Kabushiki Kaisha Kawakami Seisakusho: *See—*
Nasu, Nobuo, 4,995,287, Cl. 83-169.000.
Kabushiki Kaisha Kenwood: *See—*
Mae, Yutaka; Yaguchi, Yoichi; and Sakamoto, Masakatsu, 4,996,119, Cl. 428-469.000.
Kabushiki Kaisha Kobe Seiko Sho: *See—*
Hayashi, Norihiko; Katada, Tsuyoshi; and Koizumi, Yukio, 4,995,472, Cl. 180-234.000.
Saotome, Yoshimi, 4,995,517, Cl. 212-146.000.
Tsuboi, Noboru, 4,995,797, Cl. 418-84.000.
Kabushiki Kaisha Komatsu Seisakusho: *See—*
Fukuda, Masao, 4,995,468, Cl. 177-139.000.
Noda, Shigekazu, 4,995,255, Cl. 72-446.000.
Kabushiki Kaisha Matsuyama Seisakusho: *See—*
Koiwai, Hideo; Yamazaki, Junichi; Yoshino, Kunio; and Tsuruoka, Masaharu, 4,995,581, Cl. 248-480.000.
Kabushiki Kaisha Meidensha: *See—*
Suzuki, Yorikatsu, 4,995,139, Cl. 73-116.000.
Kabushiki Kaisha Pilot: *See—*
Akita, Yukihiro, 4,995,750, Cl. 401-104.000.
Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho: *See—*
Shinto, Hiroaki; Sakaguchi, Sumio; and Asagiri, Katuki, 4,995,638, Cl. 280-731.000.
Shirai, Noboru; and Isogai, Toshiyuki, 4,995,674, Cl. 301-37.00P.
Kabushiki Kaisha Topcon: *See—*
Katsuragi, Kenjiro; and Nishio, Kouji, 4,995,393, Cl. 128-648.000.
Kabushiki Kaisha Toshiba: *See—*
Endoh, Tetsuo; Shirota, Riichiro; Momodomi, Masaki; Tanaka, Tomoharu; Masuoka, Fujio; and Watanabe, Shigeyoshi, 4,996,669, Cl. 365-185.000.
Hamasaki, Toshihiko, 4,996,581, Cl. 357-34.000.
Imai, Shin-ichi; and Yoshie, Tatsuya, 4,996,686, Cl. 377-60.000.
Ito, Masahiro, 4,996,611, Cl. 360-72.300.
Iwamoto, Katsuharu; Kawakami, Osamu; and Miyagawa, Hideo, 4,996,418, Cl. 250-227.110.
Kimura, Takashi; and Kato, Mie, 4,996,580, Cl. 357-34.000.
Marui, Kuniyoshi; and Hattori, Kiyoshi, 4,996,715, Cl. 455-33.000.
Matsuda, Hideo; Fujiwara, Takashi; Yokota, Yoshio; Kitagawa, Mitsuhiko; Iwasaki, Masami; and Watanuki, Kazuo, 4,996,586, Cl. 357-74.000.
Motojima, Hideaki; and Kamasaki, Keiji, 4,996,578, Cl. 357-30.000.
Naya, Masaru; Kuzumaki, Masayuki; and Ishikawa, Susumu, 4,995,311, Cl. 99-295.000.
Nishida, Yasuaki; Iino, Yoshiki; Ohtake, Hiroshi; Abe, Masahide; Yoshikawa, Shigeo; Endo, Yukio; Matsunaga, Yoshiyuki; and Harada, Nozomu, 4,996,600, Cl. 358-213.220.
Saitou, Satoshi, 4,996,432, Cl. 250-370.010.
Suda, Kenichi, 4,996,612, Cl. 360-96.500.
Takahashi, Toshiaki; and Sato, Yasuji, 4,996,710, Cl. 379-202.000.
Tanaka, Shinichi; Hori, Masayuki; and Tozawa, Noriyoshi, 4,996,572, Cl. 357-23.500.
Tojima, Akihiko, 4,996,524, Cl. 340-825.020.
Ueno, Masaji, 4,996,449, Cl. 307-446.000.
Yamamoto, Tomiaki; Murayama, Akio; Kondo, Susmu; Hato, Hitoshi; Kamagami, Shinichi; and Matsumoto, Shoichi, 4,995,704, Cl. 350-334.000.
Kadel, Karl, to Daimler-Benz AG. Brake discs or brake drums. 4,995,484, Cl. 188-218.00R.
Kado, Michio: *See—*
Nishigami, Takashi; and Kado, Michio, 4,995,654, Cl. 292-216.000.
Kadowaki, Toshihiro; Ohnishi, Tetsuya; Katoh, Koichi; Suzuki, Yasumichi; and Honma, Toshio, to Canon Kabushiki Kaisha. Method of and apparatus for processing color image. 4,996,591, Cl. 358-80.000.
Kagawa, Nobuaki: *See—*
Murai, Kazuhiro; Kawashima, Yasuhiko; Takada, Shun; and Kagawa, Nobuaki, 4,996,138, Cl. 430-522.000.
Kagaya, Shinichi: *See—*
Okado, Akiyoshi; Abe, Masaki; Kagechika, Hiroshi; and Kagaya, Shinichi, 4,996,118, Cl. 428-639.000.
Kagechika, Hiroshi: *See—*
Okado, Akiyoshi; Abe, Masaki; Kagechika, Hiroshi; and Kagaya, Shinichi, 4,996,118, Cl. 428-639.000.
Kagiura, Kazuo: *See—*
Ohashi, Masashi; Toyama, Yoshikuni; Kagiura, Kazuo; Maruyama, Hiroyoshi; Shiratori, Tatsuya; Shirai, Masanari; and Ando, Eiichi, 4,995,601, Cl. 271-127.000.
Kahlcke, Hartwig: *See—*
Borger, Georg; Kahlcke, Hartwig; and Littmann, Ludwig, 4,995,164, Cl. 30-423.000.
Kahn, Gerhard: *See—*
Hilgendorff, Walter; Kahn, Gerhard; and Kaschemekat, Jurgen, 4,995,977, Cl. 210-321.690.
Kai, Osamu; Tsukada, Masaaki; and Tachibana, Hiroshi, to Tamura Electric Works, Ltd. Coin discrimination apparatus. 4,995,497, Cl. 194-318.000.
Kaiser, Reinhold, to Telefunken electronic GmbH. Integrated circuit. 4,996,569, Cl. 357-14.000.
Kaitoh, Mitsumasa; and Mori, Shoichiro, to Mitsubishi Petrochemical Co., Ltd. Sorbitol derivatives. 4,996,334, Cl. 549-364.000.
Kajiura, Hirokazu: *See—*
Mizumoto, Kunihiko; Haruta, Koichi; and Kajiura, Hirokazu, 4,995,923, Cl. 148-304.000.
Kajiwara, Ryoichi; Funamoto, Takao; Kato, Mituo; Wachi, Hiroshi; and Shida, Tomohiko, to Hitachi, Ltd. Semiconductor module and cooling device of the same. 4,996,589, Cl. 357-82.000.
Kakiuchi, Shunji: *See—*
Kitamura, Masashi; Kobayashi, Takashi; Kakiuchi, Shunji; Yamaguchi, Kiyoshi; Tomeoku, Hiroshi; Maki, Naoki; Nakata, Jyoji; and Uno, Yasumichi, 4,996,496, Cl. 328-228.000.
Kakizawa, Katsuhiro, to Canon Kabushiki Kaisha. Key telephone system adapted to respond to information stored in a portable outpulser. 4,996,708, Cl. 379-156.000.
Kakuda, Masatoshi, to Mitsubishi Denki Kabushiki Kaisha. Magnetic disk apparatus having additional carriage adapted to prevent adsorption of magnetic head. 4,996,618, Cl. 360-106.000.
Kali-Chemie AG: *See—*
Buchwald, Hans; and Raschkowski, Boleslaus, 4,995,908, Cl. 106-38.220.
Kalin, Urs, to Ferag AG. Apparatus for winding up and unwinding printed products infed and outfed in an imbricated formation by means of a conveyor. 4,995,563, Cl. 242-59.000.
Kalnins, Charles M.: *See—*
Carroll, Noel; and Kalnins, Charles M., 4,995,989, Cl. 210-788.000.
Kalota, Dennis J.; McConaghy, John S., Jr.; Foerst, Paul W.; Liu, Paul H.; and Feher, Frank R., Jr., to Monsanto Company. Novel perfluorinated polyethers and process for their preparation. 4,996,369, Cl. 568-615.000.
Kamada, Hiroshi: *See—*
Morita, Toshiya; Kita, Sumio; and Kamada, Hiroshi, 4,996,652, Cl. 364-521.000.
Kamagami, Shinichi: *See—*
Yamamoto, Tomiaki; Murayama, Akio; Kondo, Susmu; Hato, Hitoshi; Kamagami, Shinichi; and Matsumoto, Shoichi, 4,995,704, Cl. 350-334.000.
Kamano, Toshiyasu: *See—*
Ishino, Takashi; Hiyama, Isao; Nagano, Yousuke; Shikamori, Tamotu; Turuta, Shizuo; Kamano, Toshiyasu; and Ohsugi, Hiroshi, 4,995,247, Cl. 68-12.00R.
Kamasaki, Keiji: *See—*
Motojima, Hideaki; and Kamasaki, Keiji, 4,996,578, Cl. 357-30.000.
Kambe, Shigeharu; and Higuchi, Tutomu, to Unozawa - Gumi Iron Works, Ltd. Multi-section roots vacuum pump of reverse flow cooling type. 4,995,796, Cl. 418-9.000.
Kamei, Eiichi; Namba, Hideaki; Ohba, Masahiro; Tanaka, Shinichiro; and Aoki, Keiji, to Nippondenso Co., Ltd.; and Toyota Jidosha Kabushiki Kaisha. Throttle control apparatus for engines. 4,995,364, Cl. 123-442.000.
Kamei, Nobuo; and Ikenoue, Yoshikazu, to Minolta Camera Kabushiki Kaisha. Image processor capable of storing character images and graphic images in a memory and including a timer for ensuring image processing operations are carried out in a predetermined time period. 4,996,649, Cl. 364-518.000.
Kamezaki, Hisamitsu: *See—*
Saito, Osamu; Kamezaki, Hisamitsu; Suenaga, Masashi; Nagai, Ryo; Iuchi, Shinichiro; Watanabe, Hitoshi; and Fujiwara, Hideo, 4,996,089, Cl. 428-64.000.
Kamigaki, Yoshiaki: *See—*
Kume, Hitoshi; Kamigaki, Yoshiaki; Adachi, Tetsuo; Tsukada, Toshihisa; Komori, Kazuhiro; Nishimoto, Toshiaki; Muto, Tadashi; and Koizumi, Toshiko, 4,996,571, Cl. 357-23.500.
Kamiishi, Hirofumi: *See—*
Sano, Akira; Kamiishi, Hirofumi; and Matsuura, Kazuo, 4,996,011, Cl. 264-28.000.
Kampmann, Detlef: *See—*
Weber, Jurgen; Kampmann, Detlef; and Kniep, Claus, 4,996,316, Cl. 544-1.000.

Kampmeier, Eric E.: *See—*
Entenmann, John K.; Hooke, John A.; Kampmeier, Eric E.; and Posterick, Barry L., 4,996,705, Cl. 379-91.000.
Kanai, Kenichi, to NSK-Warner Kabushiki Kaisha. Roller-synchronized one-way clutch assembly. 4,995,490, Cl. 192-45.000.
Kanai, Masaharu, to Fuji Photo Film Co., Ltd. Exposure control apparatus. 4,996,551, Cl. 354-432.000.
Kanazawa Industry Co. Ltd.: *See—*
Naya, Masaru; Kuzumaki, Masayuki; and Ishikawa, Susumu, 4,995,311, Cl. 99-295.000.
Kanazawa, Minoru: *See—*
Miyoshi, Takahito; Kanazawa, Minoru; Sugisaki, Tsutomu; Yamada, Takuzi; and Okuzawa, Yasutoshi, 4,995,199, Cl. 51-326.000.
Kanegafuchi Chemical Industry Co., Ltd.: *See—*
Iwahara, Takahisa; and West, Robert C., 4,996,341, Cl. 556-406.000.
Kaneko, Noriaki: *See—*
Hayashi, Ryutaro; and Kaneko, Noriaki, 4,995,799, Cl. 425-111.000.
Kaneko, Rokusaburo: *See—*
Takemoto, Satoru; Kaneko, Rokusaburo; Miwa, Matsuyuki; and Makino, Seiji, 4,996,555, Cl. 355-44.000.
Kanemitsu, Norio; Tabata, Yoshio; and Wakabayashi, Masaru, to Fujitsu Limited; and PFU Limited. Image processing system. 4,996,603, Cl. 358-462.000.
Kang, Guo-Jun: *See—*
Cullen, William R.; Fryzuk, Michael D.; James, Brian R.; Kang, Guo-Jun; Kutney, James P.; Spogliarich, Roberto; and Thorburn, Ian S., 4,996,361, Cl. 564-304.000.
Kangas, Lauri V. M.: *See—*
Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; and Sundquist, Hannu K., 4,996,225, Cl. 514-428.000.
Kanne, Friedrich; Pfleger, Klaus; Glomb, Hans; Arnold, Gerhard; Boettcher, Klaus; and Kursawe, Siegfried. Separation system and reducing the emission of solids in pressure relief processes in high pressure polymerization reactors. 4,996,026, Cl. 422-106.000.
Kanner, Rowland W., to Ciba Vision Corporation. Contact lens case having pressure venting gasket. 4,996,027, Cl. 422-113.000.
Kanno, Hideki: *See—*
Hashida, Hideo; Kanno, Hideki; Okada, Senri; Nakamura, Kokichi; and Sumimoto, Haruyoshi, 4,996,402, Cl. 219-10.410.
Kantner, Robert C.: *See—*
Newkirk, Marc S.; Lesher, H. Daniel; Dwivedi, Ratnesh K.; and Kantner, Robert C., 4,996,176, Cl. 501-127.000.
Kapaan, Hendrikus J.: *See—*
van der Drift, Ernst; and Kapaan, Hendrikus J., 4,995,850, Cl. 464-143.000.
Kaplan, Samuel S.; and Dill, Donald S., to Chariot Star, Inc. Lathe for generating aspherical surfaces on work pieces. 4,995,300, Cl. 82-12.000.
Kapples, Kevin J.: *See—*
Effland, Richard C.; Davis, Larry; Kapples, Kevin J.; and Olsen, Gordon E., 4,996,205, Cl. 514-250.000.
Kardorff, Uwe: *See—*
Leyendecker, Joachim; Neubauer, Hans-Juergen; Kardorff, Uwe; Kuenast, Christoph; Hofmeister, Peter; and Krieg, Wolfgang, 4,996,216, Cl. 514-338.000.
Karger, Barry L.; Feibush, Binyamin; Miller, Neil T.; and Figueroa, Alvaro, to Northeastern University. Stable silica-based ether bonded phases for biopolymer separations. 4,996,343, Cl. 556-445.000.
Karidis, John P.: *See—*
Goldowsky, Michael P.; Hisano, Teiji; Karidis, John P.; Shibuya, Hiromi; and Ueda, Osamu, 4,995,744, Cl. 400-157.200.
Karilainen, Ulla: *See—*
Lehtonen, Paavo; Aaltonen, Pirkko; and Karilainen, Ulla, 4,996,062, Cl. 426-8.000.
Karjalainen, Arto J.: *See—*
Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; and Sundquist, Hannu K., 4,996,225, Cl. 514-428.000.
Karl Mayer Testilmaschinenfabrik GmbH: *See—*
Reich, Ferdinand, 4,995,246, Cl. 66-125.00R.
Karpowicz, John: *See—*
Boehringer, John R.; Nelson, Jay B.; and Karpowicz, John, 4,995,400, Cl. 128-725.000.
Kartheus, Holger: *See—*
Pietsch, Hanns; Kartheus, Holger; Holtzmann, Hans-Joachim; Sachau, Gunther; and Reul, Helmut, 4,996,054, Cl. 424-422.000.
Kaschemekat, Jurgen: *See—*
Hilgendorff, Walter; Kahn, Gerhard; and Kaschemekat, Jurgen, 4,995,977, Cl. 210-321.690.
Kashiba, Takashi: *See—*
Hatakeyama, Hidetoshi; and Kashiba, Takashi, 4,996,068, Cl. 426-234.000.
Kashida, Motokazu; Masui, Toshiyuki; Fukatsu, Tsutomu; Takei, Masahiro; Takahashi, Kouji; and Sasatani, Tomohiko, to Canon Kabushiki Kaisha. Audio signal recording apparatus. 4,996,607, Cl. 360-18.000.
Kashimoto, Kiyoshi, to Tomy Kogyo Co., Inc. Board game. 4,995,606, Cl. 273-1.0GG.
Kashio, Yukio; and Arai, Yoneaki, to Casio Computer Co., Ltd. Electronic percussion instrument. 4,995,294, Cl. 84-738.000.
Kasper, Joseph G.: *See—*
Field, Bruce F.; and Kasper, Joseph G., 4,996,468, Cl. 318-587.000.
Kass, Lawrence, to Cytocolor, Inc. Cells stained with a diazo dye. 4,996,040, Cl. 424-3.000.
Kastelic, John R.: *See—*
Gerlowski, Leonard E.; Kastelic, John R.; and Korcz, William H., 4,996,086, Cl. 427-421.000.
Katada, Tsuyoshi: *See—*
Hayashi, Norihiko; Katada, Tsuyoshi; and Koizumi, Yukio, 4,995,472, Cl. 180-234.000.
Katakura, Kageyoshi: *See—*
Nishiyama, Hisashi; Katakura, Kageyoshi; and Ogawa, Toshio, 4,995,397, Cl. 128-661.090.
Kataoka, Kazuhito: *See—*
Nakada, Toshio; Takemura, Fumio; Sema, Yoshihito; and Kataoka, Kazuhito, 4,995,999, Cl. 252-62.550.
Katayama, Kazuyuki: *See—*
Nakamura, Masayuki; Katayama, Kazuyuki; and Furuhashi, Yasuhiro, 4,995,368, Cl. 123-501.000.
Kato, Akira: *See—*
Nishio, Hiroaki; and Kato, Akira, 4,996,024, Cl. 419-40.000.
Kato, Eiichi; and Ishii, Kazuo, to Fuji Photo Film Co., Ltd. Electrophotographic lithographic printing plate precursor containing resin having hydroxy group forming functional group. 4,996,121, Cl. 430-87.000.
Kato, Kanami, to Signode Corporation. Operating apparatus for feeding, taking up and tensioning a binding strap. 4,995,776, Cl. 410-100.000.
Kato, Kichiro: *See—*
Tate, Takao; Nakamura, Norihiko; Noguchi, Hiroshi; Kawagoe, Michio; Baika, Toyokazu; Kato, Kichiro; Kido, Yoshio; Hirose, Katsuhiko; Nihei, Hiroaki; and Masubuchi, Masahiko, 4,995,347, Cl. 123-65.0BA.
Kato, Mie: *See—*
Kimura, Takashi; and Kato, Mie, 4,996,580, Cl. 357-34.000.
Kato, Mituo: *See—*
Kajiwara, Ryoichi; Funamoto, Takao; Kato, Mituo; Wachi, Hiroshi; and Shida, Tomohiko, 4,996,589, Cl. 357-82.000.
Kato, Shigeo: *See—*
Imai, Kuninori; Shiokawa, Takeji; Kato, Shigeo; Ishikawa, Isao; Ikeda, Toshimichi; and Otake, Kan, 4,995,711, Cl. 350-529.000.
Morita, Hirobumi; Matsuzaki, Eiichi; Chiba, Yukio; and Kato, Shigeo, 4,995,338, Cl. 118-410.000.
Kato, Yoshiaki: *See—*
Mimura, Tadao; and Kato, Yoshiaki, 4,996,424, Cl. 250-288.000.
Katoh, Koichi: *See—*
Kadowaki, Toshihiro; Ohnishi, Tetsuya; Katoh, Koichi; Suzuki, Yasumichi; and Honma, Toshio, 4,996,591, Cl. 358-80.000.
Katsuragi, Kenjiro; and Nishio, Kouji, to Kabushiki Kaisha Topcon. Alignment apparatus of noncontact type tonometer. 4,995,393, Cl. 128-648.000.
Kaufler S. A.: *See—*
Champalaune, Jean-Claude; Corveler, Yvon; and Coutard, Andre , 4,995,803, Cl. 425-190.000.
Kawabe, Ryuhei: *See—*
Shimoyashiki, Shigehiro; and Kawabe, Ryuhei, 4,996,020, Cl. 376-313.000.
Kawabe, Shigetoshi: *See—*
Tobisawa, Seiichi; Namiki, Takemasa; and Kawabe, Shigetoshi, 4,995,339, Cl. 118-410.000.
Kawada, Kosuke: *See—*
Umemoto, Teruo; Tomita, Kyoichi; Kawada, Kosuke; and Tomizawa, Ginjiro, 4,996,320, Cl. 546-9.000.
Kawagoe, Michio: *See—*
Tate, Takao; Nakamura, Norihiko; Noguchi, Hiroshi; Kawagoe, Michio; Baika, Toyokazu; Kato, Kichiro; Kido, Yoshio; Hirose, Katsuhiko; Nihei, Hiroaki; and Masubuchi, Masahiko, 4,995,347, Cl. 123-65.0BA.
Kawagoe, Nobukazu; Sugiyama, Masami; and Inaba, Masahito, to Minolta Camera Kabushiki Kaisha. Compact diffusion light mixing box and colorimeter. 4,995,727, Cl. 356-402.000.
Kawahara, Hiroshi: *See—*
Sangyoji, Kazuo; and Kawahara, Hiroshi, 4,996,552, Cl. 355-1.000.
Kawai Gakki Seisakusho Co., Ltd.: *See—*
Takahashi, Fumitaka, 4,995,291, Cl. 84-237.000.
Kawai, Michiki, to Daiwa Seiko, Inc. Low torque effect fishing reel. 4,995,571, Cl. 242-249.000.
Kawai, Satoshi: *See—*
Hiramatsu, Takeo; Fujita, Kenjiro; Nagayoshi, Yoshimasa; Hamasaki, Yoshiaki; and Kawai, Satoshi, 4,995,491, Cl. 192-58.00R.
Kawai, Tatsundo; Ogura, Makoto; Tomoda, Koji; Ichihashi, Hiroo; Seitoh, Shinichi; Kuroda, Yasuo; and Noguchi, Hiroyuki, to Canon Kabushiki Kaisha. Light emitting device and original reading apparatus having the device. 4,996,606, Cl. 358-475.000.
Kawakami, Masahiro: *See—*
Iwasaki, Katsuhiro; Takahashi, Kenji; Inoue, Shigeru; Tanabe, Haruyoshi; Kawakami, Masahiro; and Terada, Osamu, 4,995,906, Cl. 75-502.000.
Kawakami, Osamu: *See—*
Iwamoto, Katsuharu; Kawakami, Osamu; and Miyagawa, Hideo, 4,996,418, Cl. 250-227.110.
Kawakami, Yasushi: *See—*
Hirata, Keiichi; Kawakami, Yasushi; Miura, Tomoko; Mukai, Miyako; Ban, Tomohiro; and Furukawa, Akihiro, 4,995,739, Cl. 400-63.000.
Kawamoto, Takashi: *See—*
Shindo, Norikazu; Sekine, Tomoyuki; Nakamura, Yoshikatsu; and Kawamoto, Takashi, 4,996,022, Cl. 419-2.000.

Kawamura, Toshio: *See*—
Ooya, Satoshi; Sugiura, Sadanobu; Kawashima, Teruhisa; and Kawamura, Toshio, 4,995,535, Cl. 222-607.000.
Kawamura, Yoshiya: *See*—
Akano, Hirofumi; Sato, Takeshi; Okumura, Hajime; Kawamura, Yoshiya; and Shimada, Kyo, 4,996,064, Cl. 426-46.000.
Kawasaki Steel Corporation: *See*—
Hasegawa, Kazuhiro, 4,996,009, Cl. 264-5.000.
Kawashima, Teruhisa: *See*—
Ooya, Satoshi; Sugiura, Sadanobu; Kawashima, Teruhisa; and Kawamura, Toshio, 4,995,535, Cl. 222-607.000.
Kawashima, Yasuhiko: *See*—
Murai, Kazuhiro; Kawashima, Yasuhiko; Takada, Shun; and Kagawa, Nobuaki, 4,996,138, Cl. 430-522.000.
Kawasumi, Atsuko: *See*—
Yamada, Shiro; Hirata, Keiichi; Oishi, Minoru; Morimoto, Yoshinari; Furukawa, Akihiro; and Kawasumi, Atsuko, 4,996,640, Cl. 364-200.000.
Kay, Peter J.: *See*—
Flipse, Abraham R.; Kay, Peter J.; and Rozendaal, Ewoud, 4,996,023, Cl. 419-12.000.
Keane, Peter E.: *See*—
Mendes, Etienne; Vernieres, Jean-Claude; Simiaud, Jacques; and Keane, Peter E., 4,996,213, Cl. 514-300.000.
Keating, James T.: *See*—
Perusich, Stephen A.; and Keating, James T., 4,996,098, Cl. 428-229.000.
Keeler, Randall W.; and King, James L., to A.O. Smith Corporation. Apparatus and method for testing electrically controlled motor. 4,996,477, Cl. 324-158.0MG.
Keeling, James L. Neck support for nasal cannula. 4,995,384, Cl. 128-207.180.
Kegan, Neil J.; Hitchens, Ian; Robertson, Thomas; and Whitehouse, Paul A., to Foseco International Limited; and British Steel PLC. Purifying molten metal. 4,995,592, Cl. 266-44.000.
Kehrer, Lawrence L. Open top container with containment means. 4,995,525, Cl. 220-85.00R.
Keilmann, Fritz, to Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V. Frequency triplicator for microwaves. 4,996,505, Cl. 333-218.000.
Keith, Kevin: *See*—
Delau, William D.; Garman, James; and Keith, Kevin, 4,995,313, Cl. 99-467.000.
Kelleher, William J.; and Carpanzano, Anthony E., to Richardson-Vicks, Inc. Sustained release drug-resin complexes. 4,996,047, Cl. 424-79.000.
Kellems, Kenneth K.; Ryczek, William F.; and Smith, Douglas R., to Stanley Works, The. Modular shelving and hanger bar system. 4,995,323, Cl. 108-157.000.
Keller, Frank: *See*—
Beicht, Bernd; Heinemann, Joachim; Keller, Frank; and Tinz, Reinhard, 4,995,433, Cl. 141-312.000.
Keller, Richard F.; Springer, Terry L.; and Jeanquart, Jeffrey J., to Kimberly-Clark Corporation. Sprayed adhesive system for applying a continuous filament of theroplastic material and imparting a swirling motion thereto. 4,995,333, Cl. 118-300.000.
Keller, Walter, to Siemens Aktiengesellschaft. Optical system for transmitting data between a stationary part and a rotating part. 4,996,435, Cl. 250-551.000.
Kelley, Gordon A., Jr.: *See*—
Hinrichsmeyer, Kurt; Straehle, Werner; Kelley, Gordon A., Jr.; and Noth, Richard W., 4,996,587, Cl. 357-74.000.
Kelly, Michael J.: *See*—
Guilinger, Terry R.; Kelly, Michael J.; Martin, Samuel B., Jr.; Stevenson, Joel O.; and Tsao, Sylvia S., 4,995,95[illegible] Cl. 204-129.750.
Kelso, Kenneth J. Foundation leveling shim and system. 4,995,204, Cl. 52-126.100.
Kemp, Richard A.: *See*—
Hamilton, David M., Jr.; and Kemp, Richard A., 4,996,386, Cl. 585-646.000.
Kenbo, Nobumitsu, to Hitachi Ltd. Print control system. 4,996,650, Cl. 364-519.000.
Kennedy, Lawrence C.; and Huth, Ronald G., to General Motors Corporation. Pressure-responsive fluid check valve and method for viscous fluid clutch. 4,995,494, Cl. 192-58.00B.
Keogler, Paul: *See*—
Heischober, Norman; and Keogler, Paul, 4,995,290, Cl. 84-160.000.
Kerk, Stephan: *See*—
Bankel, Adolf; Strauss, Hans; and Kerk, Stephan, 4,995,317, Cl. 102-235.000.
Kern, Donald W. Ozone dispersion system. 4,995,123, Cl. 4-490.000.
Kesling, Haven S., Jr.; Shawl, Edward T.; and Zajacek, John G., to Arco Chemical Technology, Inc. Process for the preparation of aromatic bis dialkyl ureas. 4,996,359, Cl. 564-50.000.
Kessler, Jack H. Rapid sterilization enzymatic process with persistence. 4,996,146, Cl. 435-28.000.
Kester, Jeffrey A.: *See*—
Bergmeier, Stephen C.; Kester, Jeffrey A.; Moos, Walter H.; Tecle, Haile; and Thomas, Anthony J., 4,996,201, Cl. 514-212.000.
Keutgen, Peter: *See*—
Rothfuss, Hans; and Keutgen, Peter, 4,995,596, Cl. 266-281.000.
KG Maschinenfabrik: *See*—
Kolblin, Karl; and Geiger, Peter, 4,995,316, Cl. 101-123.000.
Khan, Manzoor M.: *See*—
Melmon, Kenneth L.; Goodman, Murray; Khan, Manzoor M.; Marr-Leisy, Debra; and Verlander, Michael, 4,996,221, Cl. 514-399.000.
Kher, Himat B.: *See*—
Droste, Timothy A.; Middione, Jerome J.; and Kher, Himat B., 4,995,971, Cl. 210-168.000.
Khuri-Yakub, Butrus T.; Parent, Philippe; and Reinholdtsen, Paul A., to Leland Stanford Junior University, The Board of Trustees of the. Acoustic microscope surface inspection system and method. 4,995,259, Cl. 73-593.000.
Kiblawi, Daniel F.: *See*—
Babcock, Bryce W.; Kiblawi, Daniel F.; and Wolbers, Eugene A., 4,995,492, Cl. 192-85.0CA.
Kido, Yoshio: *See*—
Tate, Takao; Nakamura, Norihiko; Noguchi, Hiroshi; Kawagoe, Michio; Baika, Toyokazu; Kato, Kichiro; Kido, Yoshio; Hirose, Katsuhiko; Nihei, Hiroaki; and Masubuchi, Masahiko, 4,995,347, Cl. 123-65.0BA.
Kieswetter, Carl A. Mounting for roadside mailbox. 4,995,576, Cl. 248-145.000.
Kikuchi, Koshin: *See*—
Tokuhiro, Tomoya; Koibuchi, Nobutaka; Miyauchi, Teruhiko; Kikuchi, Koshin; Hirokawa, Jun; Yamashiro, Kunio; Nishizuka, Sakae; Watanabe, Ippei; Maruo, Shozo; Tsutsui, Yohichiro; and Ishikawa, Sadahito, 4,995,765, Cl. 406-117.000.
Kilgrow, Donald C.; Kilgrow, Linda; and Pedersen, Melvin H. Vehicle tire deflator. 4,995,756, Cl. 404-6.000.
Kilgrow, Linda: *See*—
Kilgrow, Donald C.; Kilgrow, Linda; and Pedersen, Melvin H., 4,995,756, Cl. 404-6.000.
Kim, Dae-il; and Hwang, Woo-hyun, to Samsung Electron Devices Ltd. DC type plasma display panel. 4,996,460, Cl. 313-586.000.
Kim, Jong-Whan: *See*—
Choi, Wan-Kyoon; and Kim, Jong-Whan, 4,995,552, Cl. 228-179.000.
Kim, Moon G., to Samsung Electronics Co., Ltd. Selecting circuit for a memory operating mode. 4,996,672, Cl. 365-225.700.
Kim, Yong W.; and Frederick, William A., to Lehigh University. Optically-assisted gas decontamination process. 4,995,955, Cl. 204-157.300.
Kimberly-Clark Corporation: *See*—
Keller, Richard F.; Springer, Terry L.; and Jeanquart, Jeffrey J., 4,995,333, Cl. 118-300.000.
Kimura, Hiroshi: *See*—
Saito, Kenji; and Kimura, Hiroshi, 4,996,257, Cl. 524-262.000.
Kimura, Masayuki; Hosaka, Kunio; Takeda, Shigehumi; and Mitsuhashi, Hiroshi, to Tsumura & Co. Novel biphenyl derivative and preparation and use thereof. 4,996,331, Cl. 549-229.000.
Kimura, Takashi; and Kato, Mie, to Kabushiki Kaisha Toshiba. Bipolar semiconductor device. 4,996,580, Cl. 357-34.000.
King, James L.: *See*—
Keeler, Randall W.; and King, James L., 4,996,477, Cl. 324-158.0MG.
King, Leslie C., to Leggett & Platt, Incorporated. Chilled beverage container display bin. 4,995,238, Cl. 62-125.000.
Kinoshita, Satoshi: *See*—
Nomura, Noboru; Ueno, Atsushi; Hashimoto, Kazuhiko; and Kinoshita, Satoshi, 4,996,123, Cl. 430-20.000.
Kinzer, Daniel M., to International Rectifier Corporation. Photovoltaic isolator and process of manufacture thereof. 4,996,577, Cl. 357-30.000.
Kioritz Corporation: *See*—
Kumagai, Seiichiro; Kono, Michikata; Okai, Masakazu; and Inaga, Hisashi, 4,995,350, Cl. 123-65.0VC.
Kiriake, Masaharu: *See*—
Tone, Shoichi; and Kiriake, Masaharu, 4,995,230, Cl. 57-281.000.
Kirimoto, Tetsuo; Fujisaka, Takahiko; and Ohashi, Yoshimasa, to Mitsubishi Denki Kabushiki Kaisha. Digital beam forming radar system. 4,996,532, Cl. 342-81.000.
Kiriu, Takashi: *See*—
Tada, Akihiro; Kiriu, Takashi; and Arakawa, Motoomi, 4,996,339, Cl. 556-181.000.
Kiryu, Hironobu: *See*—
Shiraishi, Shuji; Nishihara, Takashi; Kiryu, Hironobu; and Omomo, Naoki, 4,996,657, Cl. 364-559.000.
Kis, Ludwig, to Textilmaschenenfabrik Dr. Ernst Fehrer Aktiengesellschaft. Appartaus for determining the permeability of a web to air. 4,995,271, Cl. 73-38.000.
Kishimi, Kazutomo, to Fuji Photo Film Co., Ltd. Method of and apparatus for recording image. 4,996,537, Cl. 346-1.100.
Kishita, Hirofumi: *See*—
Inomata, Hiroshi; Kishita, Hirofumi; and Yoshida, Akira, 4,996,344, Cl. 556-448.000.
Kisima, Yoshio; Iwanaga, Teruo; and Goto, Hitoshi, to Dainippon Plastics Co., Ltd. Method of an apparatus for weather resistance test. 4,995,273, Cl. 73-865.600.
Kita, Sumio: *See*—
Morita, Toshiya; Kita, Sumio; and Kamada, Hiroshi, 4,996,652, Cl. 364-521.000.
Kitagawa, Mitsuhiko: *See*—
Matsuda, Hideo; Fujiwara, Takashi; Yokota, Yoshio; Kitagawa, Mitsuhiko; Iwasaki, Masami; and Watanuki, Kazuo, 4,996,586, Cl. 357-74.000.

Kitahara, Koichi; Shimada, Takashi; Akita, Noboru; Hiramoto, Tadashi; and Sasaki, Kohhei, to Japan Pionics, Ltd. Method for cleaning exhaust gases. 4,996,030, Cl. 423-210.000.

Kitamura, Koichiro, to Kitamura Machinery Co., Ltd. Pallet changer. 4,995,502, Cl. 198-346.100.

Kitamura Machinery Co., Ltd.: *See*—
Kitamura, Koichiro, 4,995,502, Cl. 198-346.100.

Kitamura, Masashi; Kobayashi, Takashi; Kakiuchi, Shunji; Yamaguchi, Kiyoshi; Tomeoku, Hiroshi; Maki, Naoki; Nakata, Jyoji; and Uno, Yasumichi, to Hitachi, Ltd.; and Nippon Telegraph and Telephone Corp. Bending magnet. 4,996,496, Cl. 328-228.000.

Kitamura, Yoshiharu, to NHK Spring Co. Ltd. Angle adjustment device in display device. 4,995,579, Cl. 248-284.000.

Kito, Yasutami: *See*—
Oshima, Kenji; and Kito, Yasutami, 4,995,478, Cl. 187-115.000.

Kiyoharu, Hayakawa, to Brother Kogyo Kabushiki Kaisha. Pressure developing device. 4,996,554, Cl. 355-27.000.

Klann, Holm: *See*—
Foller, Werner; and Klann, Holm, 4,995,553, Cl. 236-48.00R.

Kleeman, Henry. Locking pin and nut combination and method for visual inspection thereof. 4,995,274, Cl. 73-865.800.

Klein, Schanzlin & Becker Aktiengesellschaft: *See*—
Schill, Jurgen; Heene, Hans F.; Stahl, Rainer; and Weber, Friedrich, 4,995,790, Cl. 417-360.000.

Kleine, Larry B. Tiedown device and system. 4,995,329, Cl. 114-361.000.

Klingshirn, James A.: *See*—
Talgam, Yoav; Reed, Paul A.; Haddad, Elie; and Klingshirn, James A., 4,996,641, Cl. 364-200.000.

Klinksiek, Bernd: *See*—
Bucheler, Manfred; Gehringer, Hans; Klinksiek, Bernd; and Koglin, Bernd, 4,996,004, Cl. 252-314.000.

Klockner Ferromatik Desma GmbH: *See*—
Gierschewski, Fritz; Koster, Claus D.; and Luhr, Joachim, 4,996,012, Cl. 264-40.100.

Kloeckner-Humboldt-Deutz Aktiengesellschaft: *See*—
Filges, Ralf; Klotmann, Fred; and Wutschke, Hans J., 4,995,809, Cl. 432-118.000.

Klosterman, Frank: *See*—
Inaba, Makoto; Hayashi, Masaaki; Hashiguchi, Toshihiko; Hibino, Hiroki; Sasa, Hiroyuki; Barlow, David E.; Ohshima, Yutaka; Ishihara, Kohichiro; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Klosterman, Frank; and Goodman, Jack, 4,995,396, Cl. 128-654.000.

Klotmann, Fred: *See*—
Filges, Ralf; Klotmann, Fred; and Wutschke, Hans J., 4,995,809, Cl. 432-118.000.

Knall, Gerhard: *See*—
Dagustany, Amer; Spriestersbach, Jochen; Gunther, Bernd; and Knall, Gerhard, 4,995,917, Cl. 148-3.000.

Knemeyer, Loren A. Archery bow range finder and sight. 4,995,166, Cl. 33-265.000.

Kniep, Claus: *See*—
Weber, Jurgen; Kampmann, Detlef; and Kniep, Claus, 4,996,316, Cl. 544-1.000.

Knight, Jackilyn M. Absorbent garment. 4,995,873, Cl. 604-391.000.

Knittel, Gerald H.; Smith, Stanley D.; Spector, Richard C.; and McClintock, Jack M., to Morgan Adhesives Co. Storage stable adhesive and its laminates. 4,996,088, Cl. 428-40.000.

Knoch, Martin; Reul, Helmut; and Rau, Gunter, to B. Braun Melsungen AG. Heart valve prosthesis. 4,995,881, Cl. 623-2.000.

Knodel, Erich, to Walter Graf u.Co. GmbH & Co. Fluid metering apparatus for supplying fluid out of a storage vessel to a receiver. 4,995,532, Cl. 222-43.000.

Knothe, Manfred: *See*—
Riedel, Wolfgang; Knothe, Manfred; Grisar, Roland; Wolf, Helmut; and Preier, Horst M., 4,995,725, Cl. 356-334.000.

Knowles, Steve: *See*—
Smith, Richard D.; Knowles, Steve; Cassady, R. J.; Smith, William; and Simon, Mark A., 4,995,231, Cl. 60-203.100.

Kobayashi, Goro: *See*—
Yamashita, Tsuyoshi; Kobayashi, Goro; Nakamura, Hisanori; Shibata, Youichi; and Mori, Toshihiro, 4,996,683, Cl. 370-4.000.

Kobayashi, Hiroo, to Mitsubishi Denki Kabushiki Kaishi. Cathode ray tube for color display. 4,996,459, Cl. 313-467.000.

Kobayashi, Ippei: *See*—
Inujima, Takashi; Yamazaki, Shunpei; Konuma, Toshimitsu; Hamatani, Toshiji; Sakama, Mitsunori; Yamaguchi, Toshiharu; and Kobayashi, Ippei, 4,995,706, Cl. 350-350.00S.

Kobayashi, Kinzo; Nakayama, Shinichi; and Suzuki, Shigeo, to Tokico Ltd. Disc brake. 4,995,482, Cl. 188-73.100.

Kobayashi, Norio, to Brother Kogyo Kabushiki Kaisha. Printing device with spelling check that continues printing after a delay. 4,995,740, Cl. 400-63.000.

Kobayashi, Sadao; Tomono, Hidemi; and Yoshida, Kazunobu, to Nihon Plast Co., Ltd. Apparatus for removing flash from molded products. 4,995,286, Cl. 82-101.000.

Kobayashi, Tadashi: *See*—
Yoshinaga, Kazuo; Miyazaki, Takeshi; Ohnishi, Toshikazu; Kurabayashi, Yutaka; Takasu, Yoshio; and Kobayashi, Tadashi, 4,995,705, Cl. 350-350.00S.

Kobayashi, Takaaki; Tosa, Takahumi; Sato, Hiroyuki; Okada, Hiroyoshi; Miyake, Masao; and Mori, Kenji, to Mitsubishi Kasei Corporation; and Ajinomoto Co., Inc. Feed additive for ruminants. 4,996,067, Cl. 426-96.000.

Kobayashi, Takashi: *See*—
Kitamura, Masashi; Kobayashi, Takashi; Kakiuchi, Shunji; Yamaguchi, Kiyoshi; Tomeoku, Hiroshi; Maki, Naoki; Nakata, Jyoji; and Uno, Yasumichi, 4,996,496, Cl. 328-228.000.

Kobayashi, Takeshi; Tonouchi, Masayoshi; and Sakaguchi, Yoshiyuki, to Lion Corporation. Method for etching superconductor materials. 4,996,191, Cl. 505-1.000.

Kobayashi, Tomoya: *See*—
Sakamoto, Masanori; Abe, Kunihiro; and Kobayashi, Tomoya, 4,996,643, Cl. 364-424.030.

Kobayashi, Yasushi: *See*—
Fujiwara, Michio; Matsumaru, Hiroshi; Kobayashi, Yasushi; Sakai, Yoshio; Yoneda, Kenzi; Dohi, Osamu; and Noguchi, Akihiko, 4,995,479, Cl. 187-135.000.

Kochanek, Wolfgang; and Leutner, Bernd, to BASF Aktiengesellschaft. Preparation of alkali metal nitrates. 4,995,950, Cl. 204-91.000.

Kodama, Osamu: *See*—
Yoshida, Kinoto; Fujii, Morizumi; Tsuda, Tokihiro; Suda, Shigeo; Kodama, Osamu; Kuroe, Kazuro; Tanikawa, Takumi; Nishimura, Michihiko; and Munakata, Hideyuki, 4,995,932, Cl, 156-242.000.

Koehler, Gernot; Schmidt-Thuemmes, Juergen; Hasenbein, Norbert; Schlemmer, Lothar; and Dietsche, Wolfram, to BASF Aktiengesellschaft. Preparation of aqueous synthetic wax dispersions. 4,996,259, Cl. 524-276.000.

Koening, Robert H. Radio receiver noise squelching and operational indicating alarm. 4,996,717, Cl. 455-222.000.

Koester, Rita: *See*—
von Rybinski, Wolfgang; and Koester, Rita, 4,995,998, Cl. 252-61.000.

Koga, Toshiaki; and Hatakeyama, Yasunori, to Murata Kikai Kabushiki Kaisha. Device for drawing a yarn in a slit. 4,995,562, Cl. 242-35.6DE.

Koglin, Bernd: *See*—
Bucheler, Manfred; Gehringer, Hans; Klinksiek, Bernd; and Koglin, Bernd, 4,996,004, Cl. 252-314.000.

Kohler, Burkhard: *See*—
Heinz, Hans-Detlef; Kohler, Burkhard; Meyer, Rolf-Volker; Reinking, Klaus; and Sommer, Alexa, 4,996,256, Cl. 524-112.000.

Koibuchi, Nobutaka: *See*—
Tokuhiro, Tomoya; Koibuchi, Nobutaka; Miyauchi, Teruhiko; Kikuchi, Koshin; Hirokawa, Jun; Yamashiro, Kunio; Nishizuka, Sakae; Watanabe, Ippei; Maruo, Shozo; Tsutsui, Yohichiro; and Ishikawa, Sadahito, 4,995,765, Cl. 406-117.000.

Koivisto, Juha: *See*—
Tervamaki, Jukka; Heinonen, Mauno; Priha, Matti; and Koivisto, Juha, 4,995,432, Cl. 141-130.000.

Koiwai, Hideo; Yamazaki, Junichi; Yoshino, Kunio; and Tsuruoka, Masaharu, to Kabushiki Kaisha Matsuyama Seisakusho. Inside rearview mirror assembly for motor vehicle. 4,995,581, Cl. 248-480.000.

Koizumi, Haruo: *See*—
Yamaguchi, Noboru; Nakamura, Hideo; Hagiwara, Yoshimune; Sato, Tsukasa; and Koizumi, Haruo, 4,996,659, Cl. 364-579.000.

Koizumi, Hideaki: *See*—
Maeda, Akira; Sano, Koichi; Yokoyama, Tetsuo; and Koizumi, Hideaki, 4,996,480, Cl. 324-309.000.

Koizumi, Toshiko: *See*—
Kume, Hitoshi; Kamigaki, Yoshiaki; Adachi, Tetsuo; Tsukada, Toshihisa; Komori, Kazuhiro; Nishimoto, Toshiaki; Muto, Tadashi; and Koizumi, Toshiko, 4,996,571, Cl. 357-23.500.

Koizumi, Yukio: *See*—
Hayashi, Norihiko; Katada, Tsuyoshi; and Koizumi, Yukio, 4,995,472, Cl. 180-234.000.

Kojima, Hidetaka; and Fujiwa, Takaaki, to Daicel Chemical Industries, Ltd. Process for preparing acetic acid. 4,996,357, Cl. 562-607.000.

Kolblin, Karl; and Geiger, Peter, to KG Maschinenfabrik. Screen printing machine squeegee support arrangement. 4,995,316, Cl. 101-123.000.

Kommrusch, Richard S., to Motorola, Inc. Superconducting microwave filter. 4,996,188, Cl. 505-1.000.

Komori, Kazuhiro: *See*—
Kume, Hitoshi; Kamigaki, Yoshiaki; Adachi, Tetsuo; Tsukada, Toshihisa; Komori, Kazuhiro; Nishimoto, Toshiaki; Muto, Tadashi; and Koizumi, Toshiko, 4,996,571, Cl. 357-23.500.

Komyoji, Terumasa: *See*—
Nasu, Rikuo; Komyoji, Terumasa; Nakajima, Toshio; Suzuki, Kazumi; Ito, Keiichiro; Oshima, Takeshi; and Yoshimura, Hideshi, 4,995,898, Cl. 71-90.000.

Kondo, Munetake: *See*—
Sato, Tomoaki; and Kondo, Munetake, 4,995,320, Cl. 104-118.000.

Kondo, Susmu: *See*—
Yamamoto, Tomiaki; Murayama, Akio; Kondo, Susmu; Hato, Hitoshi; Kamagami, Shinichi; and Matsumoto, Shoichi, 4,995,704, Cl. 350-334.000.

Konica Corporation: *See*—
Masukawa, Toyoaki; Uchida, Takashi; and Nakayama, Noritaka, 4,996,139, Cl. 430-558.000.
Morita, Shizuo; Matsuo, Shunji; Haneda, Satoshi; Fukuchi, Masakazu; and Shoji, Hisashi, 4,996,566, Cl. 355-246.000.
Motoi, Toshihiro; Nakazawa, Toshihiko; Takesue, Toshihiro; Takahashi, Satoshi; and Murahashi, Takashi, 4,996,540, Cl. 346-108.000.
Murai, Kazuhiro; Kawashima, Yasuhiko; Takada, Shun; and Kagawa, Nobuaki, 4,996,138, Cl. 430-522.000.
Nakayama, Tomoyuki; Hoshino, Hiroyuki; Ohtani, Hirofumi; and Matsuzaka, Syoji, 4,996,140, Cl. 430-569.000.

Soma, Utami; Koseki, Yasufumi; and Asakawa, Minoru, 4,996,625, Cl. 361-87.000.
Tobisawa, Seiichi; Namiki, Takemasa; and Kawabe, Shigetoshi, 4,995,339, Cl. 118-410.000.
Yamaguchi, Kohichi, 4,996,549, Cl. 354-173.110.

Konieczka, Howard R.: *See—*
Koper, Robert P.; and Konieczka, Howard R., 4,995,315, Cl. 101-96.000.

Konishi, Motofumi: *See—*
Fujiwara, Takutoshi; and Konishi, Motofumi, 4,996,664, Cl. 364-900.000.

Konishi, Sakuichi: *See—*
Nakaya, Toshiharu; Nagahata, Satoru; Konishi, Sakuichi; and Kuwano, Koichi, 4,996,076, Cl. 427-38.000.

Konishiroku Photo Industry Co., Ltd.: *See—*
Koshizuka, Kunihiro; Abe, Takao; Maehashi, Tatsuichi; and Inaba, Yoshihiro, 4,996,093, Cl. 428-212.000.

Kono, Michikata: *See—*
Kumagai, Seiichiro; Kono, Michikata; Okai, Masakazu; and Inaga, Hisashi, 4,995,350, Cl. 123-65.0VC.

Konuma, Toshimitsu: *See—*
Inujima, Takashi; Yamazaki, Shunpei; Konuma, Toshimitsu; Hamatani, Toshiji; Sakama, Mitsunori; Yamaguchi, Toshiharu; and Kobayashi, Ippei, 4,995,706, Cl. 350-350.00S.

Kool-Fire Limited: *See—*
Vandervaart, Gerry, 4,995,241, Cl. 62-238.700.

Kooy, Richard J.; Andrepont, John S.; Gyger, Roger F.; and Tyree, Lewis, Jr., to Chicago Bridge & Iron Technical Services Company. Power generation from LNG. 4,995,234, Cl. 60-648.000.

Koper, Robert P.; and Konieczka, Howard R., to Paymaster Corporation, The. Money order imprinter. 4,995,315, Cl. 101-96.000.

Korcz, William H.: *See—*
Gerlowski, Leonard E.; Kastelic, John R.; and Korcz, William H., 4,996,086, Cl. 427-421.000.

Kornfeind, Joseph. Disposable toothbrush sanitizing and storage device. 4,995,509, Cl. 206-209.100.

Korsunsky, Iosif; Schroepfer, Richard C.; and Leidy, James A., to AMP Incorporated. Electronic module socket with resilient latch. 4,995,825, Cl. 439-328.000.

Koseki, Yasufumi: *See—*
Soma, Utami; Koseki, Yasufumi; and Asakawa, Minoru, 4,996,625, Cl. 361-87.000.

Koshimizu, Koichi: *See—*
Sakata, Isao; Nakajima, Susumu; Koshimizu, Koichi; Samejima, Natsuki; Inohara, Kazumi; Takata, Hiroyuki; Yamauchi, Hirohiko; Ueda, Nobuo; and Hazue, Masaaki, 4,996,312, Cl. 540-145.000.

Koshizuka, Kunihiro; Abe, Takao; Maehashi, Tatsuichi; and Inaba, Yoshihiro, to Konishiroku Photo Industry Co., Ltd. Thermal transfer recording medium. 4,996,093, Cl. 428-212.000.

Kositzke, Robert H., to Albany International Corp. Paper machine fabric. 4,995,429, Cl. 139-383.00R.

Kossiakoff, Nicolas; and Augis, Daniel, to International Flavors & Fragrances, Inc. Non-combustible artificial cigarette. 4,995,407, Cl. 131-359.000.

Koster, Claus D.: *See—*
Gierschewski, Fritz; Koster, Claus D.; and Luhr, Joachim, 4,996,012, Cl. 264-40.100.

Kosuge, Tokuo: *See—*
Okamoto, Yoshio; Nakamura, Yozo; Uchiyama, Kyoichi; Watanabe, Haruo; Kosuge, Tokuo; Onishi, Akira; Terasaki, Akashi; Ando, Hiroyuki; and Hamashima, Eiji, 4,995,559, Cl. 239-493.000.

Kotegawa, Ikuyo, Tetsuya Kotegawa, Takeshi Kotegawa, Toshiki Kotegawa, heirs: *See—*
Kotegawa, Katsumi, deceased; Okuda, Yoshihiro; Uera, Masaru; and Miki, Hirofumi, 4,995,566, Cl. 242-77.200.

Kotegawa, Katsumi, deceased (by Kotegawa, Ikuyo, Tetsuya Kotegawa, Takeshi Kotegawa, Toshiki Kotegawa, heirs); Okuda, Yoshihiro; Uera, Masaru; and Miki, Hirofumi, to Tsubakimoto Chain Co. Reel. 4,995,566, Cl. 242-77.200.

Kotter, Dale K.; and Rankin, Richard A., to United States of America, Energy. Digital optical conversion module. 4,996,531, Cl. 341-157.000.

Kotula, Frank: *See—*
Amplatz, Kurt; and Kotula, Frank, 4,995,866, Cl. 604-53.000.

Kourtakis, Kostantinos; and Robbins, Murray, to AT&T Bell Laboratories. Method of producing mixed metal oxide material, and of producing a body comprising the material. 4,996,189, Cl. 505-1.000.

Kovac, Josip; and Ferreol-Ragotin, Andre , to Societe Anonyme dite: Alcatel Satman. General-purpose folding machine. 4,995,600, Cl. 270-45.000.

Kovach, Edward E.: *See—*
Sherwin, Gary W.; Kovach, Edward E.; and Schmidt, Albert L., 4,995,392, Cl. 128-639.000.

Kovach, John: *See—*
Cotsman, David N.; Kovach, John; Zuccaro, Dante C.; and Kudwa, Frank J., 4,995,493, Cl. 192-150.000.

Koyagi, Toshiyuki: *See—*
Oda, Junichi; Amano, Masaki; Toda, Haruhiko; and Koyagi, Toshiyuki, 4,996,158, Cl. 435-280.000.

Koyo Seiko Kabushiki Kaisha: *See—*
Hiramatsu, Takeo; Fujita, Kenjiro; Nagayoshi, Yoshimasa; Hamasaki, Yoshiaki; and Kawai, Satoshi, 4,995,491, Cl. 192-58.00R.

Koyusha Co.: *See—*
Naya, Masaru; Kuzumaki, Masayuki; and Ishikawa, Susumu, 4,995,311, Cl. 99-295.000.

Kraft General Foods, Inc.: *See—*
O'Brien, Michael J.; Spence, Jean E.; Skiff, Ronald H.; Vogel, Gerald J.; and Prasad, Ravi, 4,996,317, Cl. 544-274.000.

Krajewski, John J.: *See—*
Noren, Gerry K.; Krajewski, John J.; and Murphy, Edward J., 4,996,282, Cl. 528-75.000.

Kramer, Kent M.: *See—*
Kramer, Timothy A.; and Kramer, Kent M., 4,995,972, Cl. 210-179.000.

Kramer, Timothy A.; and Kramer, Kent M. Method and apparatus for removing liquid from permeable material. 4,995,972, Cl. 210-179.000.

Kramm, Robert C.; and Lane, Robert H., to Atlantic Richfield Company. Method for fracturing coal seams. 4,995,463, Cl. 166-308.000.

Krapez, Jean C.: *See—*
Cielo, Paolo G.; Maldague, Xavier; and Krapez, Jean C., 4,996,426, Cl. 250-330.000.

Krauter, Heinrich: *See—*
Mecke, Norbert, and Krauter, Heinrich, 4,995,741, Cl. 400-120.000.

Krief, Alain; and Dumont, Willy, to Roussel Uclaf. Enantioselective process. 4,996,349, Cl. 560-124.000.

Krieg, Manfred; Rau, Norbert; and Ude, Werner, to Rohm GmbH. Hard foam cores for laminates. 4,996,109, Cl. 428-304.400.

Krieg, Wolfgang: *See—*
Leyendecker, Joachim; Neubauer, Hans-Juergen; Kardorff, Uwe; Kuenast, Christoph; Hofmeister, Peter; and Krieg, Wolfgang, 4,996,216, Cl. 514-338.000.

Kringen, Dale E.; and Culhane, Thomas D., to Assist, Inc. Household alarm system. 4,996,517, Cl. 340-506.000.

Kristinsson, Haukur, to Ciba-Geigy Corporation. Pesticides. 4,996,325, Cl. 548-132.000.

Krog, Ann M.: *See—*
Mercado, Clara G.; and Krog, Ann M., 4,996,044, Cl. 424-64.000.

Kronich, Peter G., to Tecumseh Products Company. Engine fuel tank shroud having dampened spring retainers. 4,995,356, Cl. 123-198.00E.

Krug, James B.; Lenox, Ronald S.; and Stewart, William J., to Armstrong World Industries, Inc. Non-stick coating composition and method for thermoplastic materials. 4,995,910, Cl. 106-287.320.

Krummel, Peter, to Siemens Aktiengesellschaft. Electronic ballast for fluoroscent lamps. 4,996,462, Cl. 315-209.00R.

Krupa, Robert J.; and Owen, R. Calvin, to Imo Industries, Inc. Two-dimensional spectrometer. 4,995,721, Cl. 356-305.000.

Krupp Maschinentechnik Gesellschaft mit beschrankter Haftung: *See—*
Brussel, Richard, 4,995,778, Cl. 414-20.000.
Brussel, Richard, 4,995,933, Cl. 156-247.000.

Krynski, Stephen V., to HTI Technology Canada Ltd. Crude oil emulsion treating apparatus. 4,995,495, Cl. 196-46.000.

Krysztal, Stanislaw: *See—*
Constantine, Margaret J.; and Krysztal, Stanislaw, 4,996,006, Cl. 252-550.000.

Kubicek, Andreas: *See—*
Reumann, Manfred; Preiss, Wolfgang; and Kubicek, Andreas, 4,995,251, Cl. 72-132.000.

Kuboto, Yoshifumi: *See—*
Takagi, Shigehide; Yano, Hideo; Oku, Takashi; Shigeru, Keijiro; Kuboto, Yoshifumi; and Shishikura, Tsutomu, 4,996,177, Cl. 501-153.000.

Kuczaty, Michael: *See—*
Berbner, Heinz; Ebel, Klaus; Kuczaty, Michael; Seid, Bernhard; Woerner, Frank P.; and Zettler, Hans D., 4,996,289, Cl. 528-230.000.

Kudwa, Frank J.: *See—*
Cotsman, David N.; Kovach, John; Zuccaro, Dante C.; and Kudwa, Frank J., 4,995,493, Cl. 192-150.000.

Kuenast, Christoph: *See—*
Leyendecker, Joachim; Neubauer, Hans-Juergen; Kardorff, Uwe; Kuenast, Christoph; Hofmeister, Peter; and Krieg, Wolfgang, 4,996,216, Cl. 514-338.000.

Kugler, Lois K.: *See—*
Deemer, Mary M.; and Kugler, Lois K., 4,995,336, Cl. 119-15.000.

Kuhbauch, Gerd; and Schaller, Gotthilf, to Robert Bosch GmbH. Oscillating wiper device for motor vehicle windshields. 4,995,135, Cl. 15-250.210.

Kuhn, Franz J.: *See—*
Weber, Karl-Heinz; Walther, Gerhard; Schneider, Claus; Hinzen, Dieter; Kuhn, Franz J.; and Lehr, Erich, 4,996,224, Cl. 514-424.000.

Kuhn, George F., Jr. Safety stirrup. 4,995,226, Cl. 54-49.000.

Kuhn, Martin; and Ouziel, Philippe, to Ciba-Geigy Corporation. N-alkenoyl enamides, their preparation and the use thereof. 4,996,348, Cl. 558-445.000.

Kuhn, Max; and Schmidt, Rudi, to Sprecher Energie AG. Spring-force drive for a power switch. 4,996,397, Cl. 200-144.00B.

Kuhn, Werner, to Licentia Patent-Verwaltungs GmbH. Device for straightening articles such as letters and similar flat transported articles. 4,995,504, Cl. 198-408.000.

Kuhnt, Dietmar G.: *See—*
Taylor, Edward C.; Kuhnt, Dietmar G.; Shih, Chuan; and Grindey, Gerald B., 4,996,206, Cl. 514-258.000.

Kuizinas, Joseph. Ball throwing machine. 4,995,371, Cl. 124-7.000.

Kumagai, Seiichiro; Kono, Michikata; Okai, Masakazu; and Inaga, Hisashi, to Kioritz Corporation. 2-cycle uni-flow spark-ignition engine. 4,995,350, Cl. 123-65.0VC.

Kumar, Naresh: *See—*
Ford, David A.; Higginbotham, Gordon J. S.; Pugh, David R.; and Kumar, Naresh, 4,995,593, Cl. 266-227.000.

Kume, Hitoshi; Kamigaki, Yoshiaki; Adachi, Tetsuo; Tsukada, Toshihisa; Komori, Kazuhiro; Nishimoto, Toshiaki; Muto, Tadashi; and Koizumi, Toshiko, to Hitachi, Ltd.; and Hitachi Device Engineering Co., Ltd. Non-volatile semiconductor memory device erasing operation. 4,996,571, Cl. 357-23.500.

Kunichika, Kenji: *See—*
Toyama, Tadao; Kunichika, Kenji; Hishiki, Norio; and Nishida, Masahiro, 4,996,135, Cl. 430-309.000.

Kuo, Chan H.: *See—*
Biftu, Tesfaye; Bugianesi, Robert L.; Girotra, Nirindar N.; Ponpipom, Mitree M.; Sahoo, Soumya P.; and Kuo, Chan H., 4,996,203, Cl. 514-231.500.

Kurabayashi, Yutaka: *See—*
Yoshinaga, Kazuo; Miyazaki, Takeshi; Ohnishi, Toshikazu; Kurabayashi, Yutaka; Takasu, Yoshio; and Kobayashi, Tadashi, 4,995,705, Cl. 350-350.00S.

Kurasawa, Morio, to Kurasawa Optical Industry Co., Ltd. Deodorized bacteria composition. 4,996,055, Cl. 424-442.000.

Kurasawa Optical Industry Co., Ltd.: *See—*
Kurasawa, Morio, 4,996,055, Cl. 424-442.000.

Kurihara, Kazuyoshi: *See—*
Ogawa, Izumi; Kurihara, Kazuyoshi; Uchida, Seigo; and Nishijima, Takashi, 4,996,604, Cl. 358-474.000.

Kurita Water Industries Ltd.: *See—*
Sekikawa, Ayako; Sugi, Hideo; and Takahashi, Ryoichi, 4,996,220, Cl. 514-372.000.

Kuriyama, Katsumi: *See—*
Mitsui, Yasuhiro; Hasumi, Keiji; Watase, Shinichiro; Kuriyama, Katsumi; and Nakano, Kazuo, 4,996,422, Cl. 250-281.000.

Kurkela, Kauko O. A.: *See—*
Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; and Sundquist, Hannu K., 4,996,225, Cl. 514-428.000.

Kuroda, Yasuo: *See—*
Kawai, Tatsundo; Ogura, Makoto; Tomoda, Koji; Ichihashi, Hiroo; Seitoh, Shinichi; Kuroda, Yasuo; and Noguchi, Hiroyuki, 4,996,606, Cl. 358-475.000.

Kuroe, Kazuro: *See—*
Yoshida, Kinoto; Fujii, Morizumi; Tsuda, Tokihiro; Suda, Shigeo; Kodama, Osamu; Kuroe, Kazuro; Tanikawa, Takumi; Nishimura, Michihiko; and Munakata, Hideyuki, 4,995,932, Cl. 156-242.000.

Kursawe, Siegfried: *See—*
Kanne, Friedrich; Pfleger, Klaus; Glomb, Hans; Arnold, Gerhard; Boettcher, Klaus; and Kursawe, Siegfried, 4,996,026, Cl. 422-106.000.

Kutney, James P.: *See—*
Cullen, William R.; Fryzuk, Michael D.; James, Brian R.; Kang, Guo-Jun; Kutney, James P.; Spogliarich, Roberto; and Thorburn, Ian S., 4,996,361, Cl. 564-304.000.

Kutowy, Oleh: *See—*
Guiver, Michael D.; and Kutowy, Oleh, 4,996,271, Cl. 525-537.000.

Kuwano, Koichi: *See—*
Nakaya, Toshiharu; Nagahata, Satoru; Konishi, Sakuichi; and Kuwano, Koichi, 4,996,076, Cl. 427-38.000.

Kuwayama, Yoshinari: *See—*
Hayakawa, Youichi; Kuwayama, Yoshinari; and Yamada, Yoshihiro, 4,995,285, Cl. 74-869.000.

Kuze, Katsuaki: *See—*
Yoshinaka, Yasuo; Kuze, Katsuaki; Isaka, Tsutomu; Yamashita, Toshihiro; Matsuyama, Yujiro; Nakamura, Koichiro; Matsunaga, Tsuyoshi; and Makimura, Osamu, 4,996,291, Cl. 528-272.000.

Kuznetsov, Jury N.: *See—*
Abrosimov, Vladimir A.; Luzev, Viktor F.; Lyapunov, Vladimir N.; Kuznetsov, Jury N.; Manerov, Vladimir B.; and Skuinsh, Leon M., 4,995,730, Cl. 366-273.000.

Kuzumaki, Masayuki: *See—*
Naya, Masaru; Kuzumaki, Masayuki; and Ishikawa, Susumu, 4,995,311, Cl. 99-295.000.

Kyowa Hakko Kogyo Co., Ltd.: *See—*
Furukawa, Satoru; and Nakanishi, Toshihide, 4,996,147, Cl. 435-115.000.

Kyutoku, Hirofumi; Matsuoka, Hiroyuki; and Otani, Yoshihisa, to Osaka Gas Company, Limited. Composite non-woven fabric material. 4,996,102, Cl. 428-285.000.

Laboratoires Merck Sharp & Dohme-Chibret: *See—*
Mazuel, Claude, 4,996,197, Cl. 514-54.000.

Labsystems Oy: *See—*
Tervamaki, Jukka; Heinonen, Mauno; Priha, Matti; and Koivisto, Juha, 4,995,432, Cl. 141-130.000.

Laermer, Lothar: *See—*
Liguori, Ralph; Goldhammer, Kurt R.; and Laermer, Lothar, 4,996,630, Cl. 361-412.000.

Laguette, Stephen W.: *See—*
Heindl, Alfons; Laguette, Stephen W.; and Lintula, Leanne M., 4,995,856, Cl. 604-8.000.

Lamb, Bruce J.: *See—*
Stepaniuk, Nickolas J.; and Lamb, Bruce J., 4,996,035, Cl. 423-386.000.

Lambert, Patrick M.: *See—*
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 4,996,003, Cl. 252-301.40F.

Lamoureux, Guy; and Bibeau, Jean-Marie, to Tenco Machinery Ltd. Spreader and dump truck construction. 4,995,773, Cl. 414-489.000.

Lamptey, Jonathan C.: *See—*
Haefele, Douglas M.; Lamptey, Jonathan C.; and Marlow, Joseph L., 4,996,049, Cl. 424-93.000.

Lancefield, Timothy M.: *See—*
Gayler, Robert J.; and Lancefield, Timothy M., 4,995,358, Cl. 123-188.00M.

Landis, Abraham L.; and Lau, Kreisler S. Y., to Lockheed Corporation. Processible polyimide blends. 4,996,101, Cl. 428-272.000.

Landis, Michael E.: *See—*
Degnan, Thomas F., Jr.; and Landis, Michael E., 4,995,962, Cl. 208-110.000.

Landreth, Bobby D.: *See—*
Davis, James L.; Pennisi, Robert W.; Nounou, Fadia; and Landreth, Bobby D., 4,995,921, Cl. 148-22.000.

Landry, John C.; and Bourque, Michael R., to Insight Media, Inc. Note pad for entry into permanent records. 4,995,641, Cl. 283-67.000.

Lane, Lawrence J.: *See—*
D'Antonio, Michael J.; Gibbs, Irving A.; Lane, Lawrence J.; and Lawson, Rodney A., 4,996,519, Cl. 340-653.000.

Lane, Robert H.: *See—*
Kramm, Robert C.; and Lane, Robert H., 4,995,463, Cl. 166-308.000.
Schramm, Charles M.; Lane, Robert H.; and Dines, Martin B., deceased, 4,995,897, Cl. 71-64.110.

Lang, Stephen M.; and Webster, David F., to Smith and Nephew Associated Companies Limited. Wound dressing, manufacture and use. 4,995,382, Cl. 128-156.000.

Langen, Manfred: *See—*
Guenkinger, Siegfried; Wurster, Markus; Langen, Manfred; and Gebald, Gregor, 4,995,140, Cl. 19-159.00A.

Langenbacher, Markus; and Maier, Gernot, to Robert Bosch GmbH. Conveyor including an endless flexible conveying element and a tensioning device for the conveying element. 4,995,506, Cl. 198-814.000.

Langfeld, Horst, to Ciba-Geigy Corporation. Process for the preparation of polyazo dyes. 4,996,302, Cl. 534-582.000.

Langowski, Horst-Christian, to 501 Philips & Du Pont Optical Company. Method of removing particles from substrate surfaces. 4,996,078, Cl. 427-38.000.

Lanxide Technology Company, LP: *See—*
Newkirk, Marc S.; Lesher, H. Daniel; Dwivedi, Ratnesh K.; and Kantner, Robert C., 4,996,176, Cl. 501-127.000.

Larson, Harold: *See—*
Sauder, John A.; and Larson, Harold, 4,995,527, Cl. 220-266.000.

Larson, Ronald K.; and Imperato, John L., to Hewlett-Packard Company. Automatic control system. 4,996,500, Cl. 330-279.000.

Lash, Richard L. Ostomy cleaning and receptacle replacement station. 4,995,410, Cl. 134-113.000.

Lasker, Sigmund E.: *See—*
Arai, Toshiyuki; Gupte, Pradeep M.; and Lasker, Sigmund E., 4,996,041, Cl. 424-9.000.

Lasley, Charles T.; and Gimple, James J., to Illinois Tool Works, Inc. Paint hose extension for electrostatic spray gun. 4,995,560, Cl. 239-708.000.

Latham, Kenneth G.: *See—*
Bottenbruch, Ludwig; Ruppert, Heinrich; Isaacs, Neil S.; and Latham, Kenneth G., 4,996,373, Cl. 568-727.000.

Lau, Kreisler S. Y.: *See—*
Landis, Abraham L.; and Lau, Kreisler S. Y., 4,996,101, Cl. 428-272.000.

Lauenstein, Michael: *See—*
Berger, Maurice; and Lauenstein, Michael, 4,995,769, Cl. 414-403.000.

Lauer, Joseph J.: *See—*
Berkebile, Donald C.; Lee, Donald M.; Veneziano, Larry D.; Lauer, Joseph J.; Booth, Roy E.; and Hettinger, William P., 4,996,037, Cl. 423-447.400.

Laulhe, Rene: *See—*
Garrigues, Jean-Claude; Laulhe, Rene; and Rieuvernet, Pierre, 4,995,305, Cl. 92-138.000.

Laurence, Roger F., deceased; and Morgan, Leon R., executor, to National Research Development Corporation. Hearing aids. 4,996,712, Cl. 381-68.400.

Lauterbach, Gerald; Pape, Frank F.; and Gramlich, Walter, to BASF Aktiengesellschaft. Preparation of alkyl-substituted cinnamaldehydes. 4,996,365, Cl. 568-427.000.

LaVigne, Ronald L. Treatment system for landfill leachate. 4,995,969, Cl. 210-150.000.

Lawrence, Peter R. B.: *See—*
Farrar, David; Flesher, Peter; and Lawrence, Peter R. B., 4,996,251, Cl. 524-17.000.

Lawson, Rodney A.: *See—*
D'Antonio, Michael J.; Gibbs, Irving A.; Lane, Lawrence J.; and Lawson, Rodney A., 4,996,519, Cl. 340-653.000.

Lazarus, Richard M.; Reardon, Edward J.; and Dixit, Sunit S., to Morton International, Inc. Method of forming resist pattern and thermally stable and highly resolved resist pattern. 4,996,122, Cl. 430-17.000.

Lebovits, Alexander; Yaeger, William L.; Mercer, William B.; and Dapp, Timothy L., to United States of America, Navy. Anti-fouling castable polymers and anti-fouling polyurethanes and similar materials. 4,996,261, Cl. 525-131.000.

Lebow, Sanford: *See*—
Nelson, Gregory H.; Lebow, Sanford; and Nogavich, Eugene, 4,995,941, Cl. 156-630.000.
Lederman, Frederick E.; and Johnston, Albert D., to General Motors Corporation. Roller clutch with simplified installation. 4,995,489, Cl. 192-45.000.
Lee, Chung J., to Occidental Chemical Corporation. Novel polyimidesiloxanes and methods for their preparation and use based on diamines with pendant fluorine groups. 4,996,278, Cl. 528-26.000.
Lee, Donald M.: *See*—
Berkebile, Donald C.; Lee, Donald M.; Veneziano, Larry D.; Lauer, Joseph J.; Booth, Roy E.; and Hettinger, William P., 4,996,037, Cl. 423-447.400.
Lee, Guo-shuh J.; Burdett, Kenneth A.; and Maj, Joseph J., to Dow Chemical Company, The. Process for the preparation of para,para'-polyphenyldicarboxylic acid. 4,996,353, Cl. 562-412.000.
Lee, Guo-shuh J.: *See*—
Olken, Michael M.; Lee, Guo-shuh J.; and Garces, Juan M., 4,996,388, Cl. 585-828.000.
Lee, Martin: *See*—
Hong, Ming-Che; Wu, Ching K.; and Lee, Martin, 4,995,174, Cl. 36-72.00R.
Lee, Milton L.: *See*—
Bradshaw, Jerald S.; Lee, Milton L.; and Markides, Karin E., 4,996,277, Cl. 528-15.000.
Lee, Minyoung: *See*—
Taub, Alan I.; Frischmann, Peter G.; and Lee, Minyoung, 4,995,919, Cl. 148-9.00R.
Lee, Miryoung. Articles of play for use in the game of catch. 4,995,617, Cl. 273-346.000.
Lee, Robert D.: *See*—
Zanders, Gary V.; and Lee, Robert D., 4,996,453, Cl. 307-475.000.
Lee, Wai-Hon, to Pencom International Corp. Semiconductor laser assembly. 4,996,169, Cl. 437-209.000.
Leeson, Paul D.: *See*—
Baker, Raymond; Leeson, Paul D.; and Britcher, Susan F., 4,996,211, Cl. 514-289.000.
Leggett & Platt, Incoporated: *See*—
Dennison, Timothy D., 4,995,125, Cl. 5-247.000.
Leggett & Platt, Incorporated: *See*—
King, Leslie C., 4,995,238, Cl. 62-125.000.
Lehigh University: *See*—
Kim, Yong W.; and Frederick, William A., 4,995,955, Cl. 204-157.300.
Lehr, Erich: *See*—
Weber, Karl-Heinz; Walther, Gerhard; Schneider, Claus; Hinzen, Dieter; Kuhn, Franz J.; and Lehr, Erich, 4,996,224, Cl. 514-424.000.
Lehtonen, Paavo; Aaltonen, Pirkko; and Karilainen, Ulla, to Stabra AG. Glucose oxidase food treatment and storage method. 4,996,062, Cl. 426-8.000.
Leidy, James A.: *See*—
Korsunsky, Iosif; Schroepfer, Richard C.; and Leidy, James A., 4,995,825, Cl. 439-328.000.
Leighton, John; and Iovine, Carmine, to National Starch and Chemical Investment Holding Corporation. Hair fixative compositions containing alpha-aminomethylene phosphonate betaines. 4,996,045, Cl. 424-70.000.
Leiros, Ernest, to SEB S.A. Cooking appliance with electric heating. 4,995,312, Cl. 99-411.000.
Leist, Alan R.; Mushaben, Thomas G.; and Youtsey, Thomas E. Sectional doors and flexible hinge assemblies. 4,995,441, Cl. 160-229.100.
Leland Stanford Junior University, The Board of Trustees of the: *See*—
Khuri-Yakub, Butrus T.; Parent, Philippe; and Reinholdtsen, Paul A., 4,995,259, Cl. 73-593.000.
Melmon, Kenneth L.; Goodman, Murray; Khan, Manzoor M.; Marr-Leisy, Debra; and Verlander, Michael, 4,996,221, Cl. 514-399.000.
Lenox, Ronald S.: *See*—
Krug, James B.; Lenox, Ronald S.; and Stewart, William J., 4,995,910, Cl. 106-287.320.
Leon, Robert L., to Electric Power Research Institute, Inc. Monitor for shaft vibration in an operating turbine. 4,995,257, Cl. 73-116.000.
Leonard, Graham S.: *See*—
Carlin, Brian A. C.; Healey, John N. C.; Leonard, Graham S.; and Tovey, Geoffrey D., 4,996,222, Cl. 514-400.000.
Leppard, David G.; Slongo, Mario; and Rody, Jean, to Ciba-Geigy Corporation. Novel 2-(2-hydroxyphenyl)-benzotriazole derivatives, substituted by branched long chain alkyl groups containing ester moieties. 4,996,326, Cl. 548-261.000.
Leppkes, Reinhard: *See*—
Henn, Rolf; and Leppkes, Reinhard, 4,996,103, Cl. 428-305.500.
Leroux, Jean-Marc: *See*—
Desjardins, Pierre; Trudel, Paul;; and Leroux, Jean-Marc, 4,996,714, Cl. 382-3.000.
Lesher, H. Daniel: *See*—
Newkirk, Marc S.; Lesher, H. Daniel; Dwivedi, Ratnesh K.; and Kantner, Robert C., 4,996,176, Cl. 501-127.000.
Lettau, K. Dieter, to R. J. Reynolds Tobacco Company. Process and apparatus for producing aromatized strand-shaped smoking material. 4,995,405, Cl. 131-84.100.
Leutner, Bernd: *See*—
Kochanek, Wolfgang; and Leutner, Bernd, 4,995,950, Cl. 204-91.000.
Lever Brothers Company: *See*—
Merz, Winfried; and Schmidt, Theo, 4,995,930, Cl. 156-209.000.
Lewis, Larry N.: *See*—
Davis, Gary C.; and Lewis, Larry N., 4,996,255, Cl. 524-261.000.
Lewis, Michael D.: *See*—
Chang, Michael N.; Chiang, Yuan-Ching P.; Heck, James V.; and Lewis, Michael D., 4,996,231, Cl. 514-467.000.
Leybold Aktiengesellschaft: *See*—
Reuter, Wolfgang, 4,995,595, Cl. 266-275.000.
Strasser, Wilhelm, 4,995,237, Cl. 62-93.000.
Thomas, Friedrich-Werner; Schadlich-Stubenrauch, Jurgen; and Hediger, Alfred, 4,995,733, Cl. 374-140.000.
Leyendecker, Joachim; Neubauer, Hans-Juergen; Kardorff, Uwe; Kuenast, Christoph; Hofmeister, Peter; and Krieg, Wolfgang, to BASF Aktiengesellschaft. Phenoxyalkyl-substituted heteroaromatics and their use for controlling pests. 4,996,216, Cl. 514-338.000.
Li, Kin: *See*—
Young, Peter L.; Cech, Jay; and Li, Kin, 4,996,584, Cl. 357-71.000.
Licentia Patent-Verwaltungs GmbH: *See*—
Kuhn, Werner, 4,995,504, Cl. 198-408.000.
Liebel, Henry L., to Shippers Paper Products Company. Interior core protector. 4,995,512, Cl. 206-396.000.
Liebel, Kurt A.: *See*—
Hess, Richard F.; Liebel, Kurt A.; and Yount, Larry J., 4,996,687, Cl. 371-10.100.
Ligon Brothers Mfg. Co.: *See*—
Ligon, James T., Jr., 4,995,582, Cl. 248-544.000.
Ligon, James T., Jr., to Ligon Brothers Mfg. Co. Anti-skid reinforcing plate. 4,995,582, Cl. 248-544.000.
Liguori, Ralph; Goldhammer, Kurt R.; and Laermer, Lothar, to Plessey Electronic Systems Corp. Hybrid module electronics package. 4,996,630, Cl. 361-412.000.
Likens, Billy G. Delivery box signaling arrangement. 4,995,330, Cl. 116-175.000.
Lin, Chung Y., to Dow Chemical Company, The. Polyurethane foams manufactured with mixed gas/liquid blowing agents. 4,996,242, Cl. 521-131.000.
Lin, Jiang-Jen: *See*—
Speranza, George P.; and Lin, Jiang-Jen, 4,996,315, Cl. 540-454.000.
Lin, Jin-Jie: *See*—
Colonias, Karen W.; Commins, Alfred D.; Gilb, Tyrell T.; Lin, Jin-Jie; and Moore, Richard D., 4,995,206, Cl. 52-297.000.
Lin, Lon-Tang W.: *See*—
Ching, Ta Y.; and Lin, Lon-Tang W., 4,996,342, Cl. 556-437.000.
Lin, Shaw-Chan; and Cochran, Robert N., to Arco Chemical Technology, Inc. Hydrogenation of acetophenone. 4,996,374, Cl. 568-814.000.
Lin, Stephen C. Y., to Honeywell Inc. Disturbance resistant data storage circuit. 4,996,445, Cl. 307-272.300.
Lin, Yang-I: *See*—
Bitha, Panayota; Hlavka, Joseph J.; and Lin, Yang-I, 4,996,337, Cl. 556-137.000.
Lindner, Werner; and Brandes, Wilhelm, to Bayer Aktiengesellschaft. Pesticidal thiazolopyrimidine derivatives. 4,996,208, Cl. 514-258.000.
Lingorski, Nikola A.; Hadjiiski, Mincho B.; Yovchev, Rumen B.; Spassov, Kamen B.; and Savov, Peter H., to Nis Pri Vissh Chimikotechnologiches Ki Institut. Method and apparatus for continuous measurement of the temperature of electroconductive melt and the thickness of refractory lining. 4,995,732, Cl. 374-139.000.
Linker, Frank V., to American Tech Manufacturing, Corp. Coplanarity inspection machine. 4,996,439, Cl. 250-561.000.
Lintula, Leanne M.: *See*—
Heindl, Alfons; Laguette, Stephen W.; and Lintula, Leanne M., 4,995,856, Cl. 604-8.000.
Lion Corporation: *See*—
Itoi, Hiroshi; Sano, Hiroshi; and Shibasaki, Kenichiro, 4,996,307, Cl. 536-20.000.
Kobayashi, Takeshi; Tonouchi, Masayoshi; and Sakaguchi, Yoshiyuki, 4,996,191, Cl. 505-1.000.
Lionel Abrams: *See*—
Abrams, Lionel; Fisher, Arthur; and Jameson, Ronald F., 4,995,337, Cl. 119-18.000.
Lip-Prints, Inc.: *See*—
Wallschlaeger, Gunnar J., 4,995,408, Cl. 132-320.000.
Lischke, Burkard, to Siemens Aktiengesellschaft. Lithographic apparatus for structuring a subject. 4,996,441, Cl. 250-492.200.
Listemann, Mark L.: *See*—
Pierantozzi, Ronald; Miller, Mildred A.; Listemann, Mark L.; Gaffney, Thomas R.; and Coe, Charles G., 4,996,322, Cl. 564-216.000.
Little Tikes Company, The: *See*—
Mariol, James F., 4,995,846, Cl. 446-376.000.
Littmann, Ludwig: *See*—
Borger, Georg; Kahlcke, Hartwig; and Littmann, Ludwig, 4,995,164, Cl. 30-423.000.
Litton Systems, Inc.: *See*—
Amzajerdian, Farzin, 4,995,720, Cl. 356-5.000.
Liu, Paul H.: *See*—
Kaiota, Dennis J.; McConaghy, John S., Jr.; Foerst, Paul W.; Liu, Paul H.; and Feher, Frank R., Jr., 4,996,369, Cl. 568-615.000.
Liu, Yin-Chic. Control mechanism of electronic lock having double bolts. 4,995,248, Cl. 70-107.000.
Ljokkoi, Risto; Niiranen, Tapani; Purho, Pekka; Savolainen, Erkki; and Siitonen, Jari, to Ahlstrom Corporation. Method and apparatus for improving the operation of a disc filter. 4,995,991, Cl. 210-797.000.
Lo, Shui-Yin, to Apricot S.A. Electrically conductive solution comprised of charged boson ions. 4,995,699, Cl. 350-96.320.

Lockheed Corporation: *See—*
Landis, Abraham L.; and Lau, Kreisler S. Y., 4,996,101, Cl. 428-272.000.

Loffler, Markus; and Braunsberger, Ulrich, to TZN Forschungs-und Entwicklungszentrum Unterluss GmbH; and Rheinmetall GmbH. Inductive energy converter with spaced winding contacts. 4,996,455, Cl. 310-12.000.

Lohr & Bromkamp GmbH: *See—*
Schwarzler, Peter; Wormsbacher, Hans; and Beier, Rudolf, 4,995,853, Cl. 464-144.000.

Lohrmann, Gerhard: *See—*
Engelhardt, Gunther; Lohrmann, Gerhard; and Werner, Thomas, 4,995,747, Cl. 400-625.000.

Longo, Gianantonio: *See—*
Curto, Caterino; and Longo, Gianantonio, 4,995,713, Cl. 351-113.000.

Loosdregt, Henri: *See—*
Rappart, Alain; Loosdregt, Henri; Pershon, Paul; and Persohn, Philippe, 4,995,643, Cl. 285-4.000.

Loprete, Joseph F., to Bristol Compressors, Inc. Refrigerant gas compressor unit. 4,995,791, Cl. 417-366.000.

L'Oreal: *See—*
Grollier, Jean F.; and Fiquet, Claire, 4,996,059, Cl. 424-71.000.

Lorenzana, Moises B.; and Lorenzana, Vance A. Dental floss tool. 4,995,361, Cl. 132-324.000.

Lorenzana, Vance A.: *See—*
Lorenzana, Moises B.; and Lorenzana, Vance A., 4,995,361, Cl. 132-324.000.

Lorenzen, Claus-Jurgen: *See—*
Carlhoff, Christoph; Lorenzen, Claus-Jurgen; and Nick, Klaus-Peter, 4,995,723, Cl. 356-318.000.

Lorey, Manfred; and Potz, Karl, to Lorey, Manfred. Separator element. 4,995,974, Cl. 210-247.000.

Louison, Bernard; and Burton, Camille, to SEB S.A. Laundry-iron sole-plate formed by assembling together a plurality of metal sheets brazed to each other. 4,995,177, Cl. 38-88.000.

Love, Graham; Schellhaass, Karl; Rathjen, Barbel; and Schwarz, Jurgen, to Hag GF Aktiengesellschaft. Beverage flavoring cassette. 4,996,066, Cl. 426-77.000.

Lovett, Robert H., to Brinkmann Corporation, The. Low voltage light fixture. 4,996,636, Cl. 362-431.000.

Lowell, Charles R.; and Sterritt, Janet R., to Hollis Automation, Inc. Mass soldering system providing an improved fluid blast. 4,995,411, Cl. 134-198.000.

Lucas Industries: *See—*
Sutton, Arthur E., 4,995,232, Cl. 60-243.000.

Lucas Industries public limited company: *See—*
Hazelden, Roger J.; Sheppard, Ian J.; and Taft, Philip A., 4,995,480, Cl. 188-1.110.

Luhr, Joachim: *See—*
Gierschewski, Fritz; Koster, Claus D.; and Luhr, Joachim, 4,996,012, Cl. 264-40.100.

Lulloff, Ricky H., to Brunswick Corporation. Automatically controlled exhaust assembly for marine stern drive. 4,995,233, Cl. 60-324.000.

Lunden, Goran, to Moagon AG. Device for indicating angular position. 4,995,169, Cl. 33-534.000.

Lundstrom, Robert W.; Sannel, Benjamin H.; and Warwick, Dennis J., to DataCard Corporation. Transport system and method for embossing apparatus. 4,995,501, Cl. 198-341.000.

Lunts, Lawrence H. C., to Glaxo Group Limited. Chloroaniline derivatives. 4,996,218, Cl. 514-365.000.

Lupke, Manfred A. A. Extrusion die assembly. 4,995,800, Cl. 425-131.100.

Lutz, Albert W.; and Rodaway, Shirley J., to American Cyanamid Company. Alkyl-, Alkenyl- and alkynylnitroguanidines as cytokinin plant growth regulants. 4,995,903, Cl. 71-121.000.

Luzev, Viktor F.: *See—*
Abrosimov, Vladimir A.; Luzev, Viktor F.; Lyapunov, Vladimir N.; Kuznetsov, Jury N.; Manerov, Vladimir B.; and Skuinsh, Leon M., 4,995,730, Cl. 366-273.000.

Lyapunov, Vladimir N.: *See—*
Abrosimov, Vladimir A.; Luzev, Viktor F.; Lyapunov, Vladimir N.; Kuznetsov, Jury N.; Manerov, Vladimir B.; and Skuinsh, Leon M., 4,995,730, Cl. 366-273.000.

Lynam, Niall R.: *See—*
Moser, Frank H.; and Lynam, Niall R., 4,996,083, Cl. 427-108.000.

Lynch, Ronald E.; and Smith, Bradley W. Aerobic water weight. 4,995,604, Cl. 272-122.000.

Lynch, Samuel C.: *See—*
Patteson, R. Mark; and Lynch, Samuel C., 4,995,763, Cl. 405-195.000.

Lynch, William T.; and Manchanda, Lalita, to AT&T Bell Laboratories. Radiation-sensitive device. 4,996,576, Cl. 357-29.000.

Lyonnaise des Eaux: *See—*
Rappart, Alain; Loosdregt, Henri; Pershon, Paul; and Persohn, Philippe, 4,995,643, Cl. 285-4.000.

Maag, Horst: *See—*
Gruber, Walter; and Maag, Horst, 4,995,585, Cl. 251-30.030.

Mabry, John F. Rod guide/paraffin scraper. 4,995,459, Cl. 166-176.000.

Machin, Peter J.: *See—*
Handa, Balraj K.; Johnson, William H.; and Machin, Peter J., 4,996,358, Cl. 562-621.000.

Machino, Atsumi, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Dynamic valve mechanism of internal combustion engine. 4,995,352, Cl. 123-90.390.

Macintosh, David W.: *See—*
Dack, David G.; Huckett, Eric P.; and Macintosh, David W., 4,996,695, Cl. 375-10.000.

Mack Trucks, Inc.: *See—*
Evans, Maxwell E., 4,995,634, Cl. 280-682.000.

MacKay, Colin A., to Microelectronics and Computer Technology Corporation. Bonding electrical leads to pads on electrical components. 4,995,551, Cl. 228-177.000.

MacKenzie, Peter A.: *See—*
Spencer, Kenneth W.; Horvat, David T.; and MacKenzie, Peter A., 4,995,894, Cl. 65-19.000.

MacMillan Bloedel Limited: *See—*
Eadie, Donald T.; and Fyles, Thomas M., 4,995,983, Cl. 210-639.000.

Mae, Yutaka; Yaguchi, Yoichi; and Sakamoto, Masakatsu, to Kabushiki Kaisha Kenwood. Speaker cone plate and method of forming. 4,996,119, Cl. 428-469.000.

Maeda, Akira; Sano, Koichi; Yokoyama, Tetsuo; and Koizumi, Hideaki, to Hitachi, Ltd. Image reconstructing device for use in magnetic resonance imaging apparatus. 4,996,480, Cl. 324-309.000.

Maeda Industries, Ltd.: *See—*
Tagawa, Koichi, 4,995,280, Cl. 74-480.00R.

Maeda, Yasuaki, to Sony Corporation. Apparatus for rewriting an optical disc while updating its table of contents and without leaving gaps. 4,996,678, Cl. 369-32.000.

Maehashi, Tatsuichi: *See—*
Koshizuka, Kunihiro; Abe, Takao; Maehashi, Tatsuichi; and Inaba, Yoshihiro, 4,996,093, Cl. 428-212.000.

Maerzke, James T.; and Trick, Robert E., to Medical Engineering Corporation. Penile prosthesis. 4,995,380, Cl. 128-79.000.

Maezawa, Hiroshi; and Tomotsu, Norio, to Idemitsu Kosan Company Limited. Process for preparation of aluminoxane. 4,996,338, Cl. 556-179.000.

Magaribuchi, Tetsuo: *See—*
Honma, Yasushi; Tamaki, Hajime; Magaribuchi, Tetsuo; and Takido, Mine, 4,996,217, Cl. 514-338.000.

Maginnis, Richard L.: *See—*
Mak, Sioe T.; Maginnis, Richard L.; and Franzen, Kevin J., 4,996,513, Cl. 340-310.00R.

Magner, Thomas J.: *See—*
Barney, RIchard D.; and Magner, Thomas J., 4,995,700, Cl. 350-266.000.

Magnusson, Claes. Locking device for sliding panels. 4,995,649, Cl. 292-175.000.

Magruder, Judy A.: *See—*
Eckenhoff, James B.; Magruder, Judy A.; Cortese, Richard; Peery, John R.; and Wright, Jeremy C., 4,996,060, Cl. 424-473.000.

Magyar Tudomanyos Akademia Muszaki Fizikai Kutato Intezete: *See—*
Ferenczi, Gyorgy; Erdelyi, Katalin; Somogyi, Maria; Boda, Janos; Fule, Gyorgy; and Aszodi, Gabor, 4,995,939, Cl. 156-627.000.

Mahler, Thomas G.: *See—*
Aurness, Harold O.; and Mahler, Thomas G., 4,995,661, Cl. 294-1.400.

Mahoney, David F.: *See—*
Doolin, Lawrence E.; Gale, Richard M.; Godfrey, Otis W.; Hamill, Robert L.; Mahoney, David F.; and Yao, Raymond C., 4,996,148, Cl. 435-119.000.

Maier, Gernot: *See—*
Langenbacher, Markus; and Maier, Gernot, 4,995,506, Cl. 198-814.000.

Maj, Joseph J.: *See—*
Lee, Guo-shuh J.; Burdett, Kenneth A.; and Maj, Joseph J., 4,996,353, Cl. 562-412.000.

Mak, Sioe T.; Maginnis, Richard L.; and Franzen, Kevin J., to Emerson Electric Co. Carrier stability erasure filling system for communications over electricity distribution network. 4,996,513, Cl. 340-310.00R.

Maki, Kazuya: *See—*
Yamaguchi, Kouji; and Maki, Kazuya, 4,995,470, Cl. 180-197.000.

Maki, Naoki: *See—*
Kitamura, Masashi; Kobayashi, Takashi; Kakiuchi, Shunji; Yamaguchi, Kiyoshi; Tomeoku, Hiroshi; Maki, Naoki; Nakata, Jyoji; and Uno, Yasumichi, 4,996,496, Cl. 328-228.000.

Makimura, Osamu: *See—*
Yoshinaka, Yasuo; Kuze, Katsuaki; Isaka, Tsutomu; Yamashita, Toshihiro; Matsuyama, Yujiro; Nakamura, Koichiro; Matsunaga, Tsuyoshi; and Makimura, Osamu, 4,996,291, Cl. 528-272.000.

Makino, Seiji: *See—*
Takemoto, Satoru; Kaneko, Rokusaburo; Miwa, Matsuyuki; and Makino, Seiji, 4,996,555, Cl. 355-44.000.

Makino, Shigeo: *See—*
Enoki, Yasutaka; Makino, Shigeo; and Murase, Shinji, 4,995,437, Cl. 152-209.00R.

Makitka, Harry: *See—*
Garrett, Jeffrey L.; Makitka, Harry; Sanchez, Richard J.; and Shepler, Gregory W., 4,995,892, Cl. 65-12.000.

Malbe, Serge; Da Silva, Evelyne; and Fouche, Alain, to Thomson Hybrides et Microondes. Device for interconnection and protection of a bare microwave component chip. 4,996,588, Cl. 357-80.000.

Maldague, Xavier: *See—*
Cielo, Paolo G.; Maldague, Xavier; and Krapez, Jean C., 4,996,426, Cl. 250-330.000.

Mallavarapu, Leo X. Novel epoxy sulfonamide-based resins, a process for their preparation and use of same. 4,996,284, Cl. 528-92.000.

Mallick, George T., Jr., to Westinghouse Electric Corp. Passive superconducting quench detection sensor. 4,996,472, Cl. 324-71.600.

Mallinckrodt, Inc.: *See*—
Gurusamy, Narayanasamy, 4,996,355, Cl. 562-493.000.
Stepaniuk, Nickolas J.; and Lamb, Bruce J., 4,996,035, Cl. 423-386.000.
Malone, Peter J.: *See*—
Barthel, Richard C.; Malone, Peter J.; Orth, Charles D.; and Jarosch, George W., 4,995,240, Cl. 62-225.000.
Malone, Thomas C.; and Sircar, Jagadish C., to Warner-Lambert Company. -2-Amino-4,6-dichloro-5-(2-cyanomethyl-2-amino-5(cyanomethyl)-4,6-dichloro pyrimidine. 4,996,319, Cl. 544-330.000.
Malott, John S., to Downing Displays, Inc. Edge-to-edge attachment system for display panels. 4,995,211, Cl. 52-582.000.
Manaka, Toshio; and Shida, Masami, to Hitachi, Ltd. Method for controlling air-fuel ratio for use in internal combustion engine and apparatus for controlling the same. 4,995,366, Cl. 123-492.000.
Manchanda, Lalita: *See*—
Lynch, William T.; and Manchanda, Lalita, 4,996,576, Cl. 357-29.000.
Manerov, Vladimir B.: *See*—
Abrosimov, Vladimir A.; Luzev, Viktor F.; Lyapunov, Vladimir N.; Kuznetsov, Jury N.; Manerov, Vladimir B.; and Skuinsh, Leon M., 4,995,730, Cl. 366-273.000.
Mani, Krishnamurthy N., to Allied-Signal Inc. Method and apparatus to control a salt stream to be treated in an electrodialytic water splitter. 4,995,956, Cl. 204-182.400.
Manifold, Steve M.: *See*—
Walls, W. Alan; Estes, Elvin; Manifold, Steve M.; Spann, Michael L.; and Gully, John H., 4,996,016, Cl. 264-229.000.
Mannesman Aktiengesellschaft: *See*—
Erlbruch, Peter, 4,995,861, Cl. 475-298.000.
Mannesmann Aktiengesellschaft: *See*—
Engelhardt, Gunther; Lohrmann, Gerhard; and Werner, Thomas, 4,995,747, Cl. 400-625.000.
von Borcke, Wulff-Eckard; and Meyerling, Wilfried, 4,995,201, Cl. 51-411.000.
Manufacture d'Appareillage Electriquie de Cahors: *See*—
Rappart, Alain; Loosdregt, Henri; Pershon, Paul; and Persohn, Philippe, 4,995,643, Cl. 285-4.000.
Mapes, Kenneth W.: *See*—
Zias, Arthur R.; Block, Barry; Mapes, Kenneth W.; Nystrom, Norman L.; and Cadwell, Robert M., 4,996,627, Cl. 361-283.000.
Maralda Oilwell Technology Ltd.: *See*—
Sask, David; Obrejanu, Marcel; and Grimshaw, Allen, 4,995,462, Cl. 166-304.000.
Marangon, Claudio: *See*—
Bernardis, Francesco; Marangon, Claudio; and Ferrarotti, Rinaldo, 4,995,743, Cl. 400-124.000.
Marathon Oil Company: *See*—
Barthorpe, Richard T., 4,995,982, Cl. 210-634.000.
Sydansk, Robert D., 4,995,461, Cl. 166-295.000.
Marchiset, Michel: *See*—
Devouassoux, Serge; Marchiset, Michel; and Saxod, Michel, 4,995,621, Cl. 277-37.000.
Marengo, Osvaldo, to FAPA S.p.A. Motor vehicle roof rack. 4,995,538, Cl. 224-329.000.
Mariol, James F., to Little Tikes Company, The. Toy figure with pivotal lower torso. 4,995,846, Cl. 446-376.000.
Markides, Karin E.: *See*—
Bradshaw, Jerald S.; Lee, Milton L.; and Markides, Karin E., 4,996,277, Cl. 528-15.000.
Markson, Ralph J.; and Anderson, Bruce E., to Airborne Research Associates, Inc. Microburst/windshear warning system. 4,996,473, Cl. 324-72.000.
Marler Haley Exposystems Limited: *See*—
Morgan, James N.; and Rivers-Bland, Simon A. S., 4,995,212, Cl. 52-646.000.
Marlow, Joseph L.: *See*—
Haefele, Douglas M.; Lamptey, Jonathan C.; and Marlow, Joseph L., 4,996,049, Cl. 424-93.000.
Marmar, Joel L.; and Henderson, Brian R., to Performance Plus, Inc. Male therapeutic device. 4,995,381, Cl. 128-79.000.
Marr-Leisy, Debra: *See*—
Melmon, Kenneth L.; Goodman, Murray; Khan, Manzoor M.; Marr-Leisy, Debra; and Verlander, Michael, 4,996,221, Cl. 514-399.000.
Marra, Dorothea C.: *See*—
Osipow, Lloyd I.; Marra, Dorothea C.; and Spitzer, J. George, 4,996,240, Cl. 521-78.000.
Marraccini, Antonio; Pasquale, Antonio; and Fiorani, Tiziana, to Ausimont S.r.l. Process for preparing fluorinated conjugated olefinic products and new products thus obtained. 4,996,370, Cl. 568-674.000.
Marschner, Steven S.; and Fine, Jeffrey B., to General Mills, Inc. Physical process for the deodorization and/or cholesterol reduction of fats and oils. 4,996,072, Cl. 426-417.000.
Marshall, George W.: *See*—
Petitto, Angelo S.; Petitto, Angelo A.; Petitto, James L.; and Marshall, George W., 4,995,783, Cl. 414-786.000.
Martelo, Orlando J.: *See*—
Zimmer, Hans W.; Martelo, Orlando J.; and Franco, Robert S., 4,996,227, Cl. 514-444.000.
Martija, Henry M., to Datatape Incorporated. Reel brake assembly actuated by linear stepper motor. 4,995,570, Cl. 242-193.000.
Martin Engineering Company: *See*—
Taylor, Dennis E.; and Goldbeck, Larry J., 4,995,851, Cl. 474-101.000.
Martin, Frederic; and Crozat, Georges, to Faiveley Entreprises. Heat-exchanger reactor. 4,996,029, Cl. 422-188.000.
Martin Marietta Corporation: *See*—
Alexius, Richard C., 4,995,587, Cl. 251-129.060.
Martin Marietta Magnesia Specialties Inc.: *See*—
Van de Walle, Richard H., 4,996,065, Cl. 426-72.000.
Martin, Samuel B., Jr.: *See*—
Guilinger, Terry R.; Kelly, Michael J.; Martin, Samuel B., Jr.; Stevenson, Joel O.; and Tsao, Sylvia S., 4,995,954, Cl. 204-129.750.
Martlew, David; and Rigby, Malcom J., to Pilkington PLC. Glass coating apparatus. 4,995,340, Cl. 118-715.000.
Marui, Kuniyoshi; and Hattori, Kiyoshi, to Kabushiki Kaisha Toshiba. Radio telephone apparatus. 4,996,715, Cl. 455-33.000.
Marumanji Sangyo Co., Ltd.: *See*—
Matsuda, Toshihiko, 4,995,126, Cl. 5-421.000.
Maruo, Shozo: *See*—
Tokuhiro, Tomoya; Koibuchi, Nobutaka; Miyauchi, Teruhiko; Kikuchi, Koshin; Hirokawa, Jun; Yamashiro, Kunio; Nishizuka, Sakae; Watanabe, Ippei; Maruo, Shozo; Tsutsui, Yohichiro; and Ishikawa, Sadahito, 4,995,765, Cl. 406-117.000.
Maruyama, Hiroyoshi: *See*—
Ohashi, Masashi; Toyama, Yoshikuni; Kagiura, Kazuo; Maruyama, Hiroyoshi; Shiratori, Tatsuya; Shirai, Masanari; and Ando, Eiichi, 4,995,601, Cl. 271-127.000.
Maruyama, Masatoshi: *See*—
Hasegawa, Yukinobu; Shimomura, Hiroyoshi; Murai, Koichi; Maruyama, Masatoshi; and Tange, Toyokichi, 4,996,127, Cl. 430-109.000.
Marzec, Stanley E. Curtain opening device. 4,995,442, Cl. 160-331.000.
Masanori, Itakiyo: *See*—
Sakamoto, Naoki; and Masanori, Itakiyo, 4,996,559, Cl. 355-56.000.
Masato Sagawa: *See*—
Sagawa, Masato, 4,995,905, Cl. 75-244.000.
Mascarin, Guy: *See*—
Doeuvne, Jean P.; and Mascarin, Guy, 4,996,436, Cl. 250-560.000.
Maschinenfabrik Andritz Actiengesellschaft: *See*—
Seidinger, Gottfried, 4,995,541, Cl. 226-174.000.
Mashine, Hiroyoshi: *See*—
Yoshinaga, Sadao; and Mashine, Hiroyoshi, 4,995,171, Cl. 34-97.000.
Masini, Marco: *See*—
Chiriatti, Antonio; and Masini, Marco, 4,996,451, Cl. 307-468.000.
Mason, L. Dale. Indicator of under inflated tire. 4,996,516, Cl. 340-443.000.
Masubuchi, Masahiko: *See*—
Tate, Takao; Nakamura, Norihiko; Noguchi, Hiroshi; Kawagoe, Michio; Baika, Toyokazu; Kato, Kichiro; Kido, Yoshio; Hirose, Katsuhiko; Nihei, Hiroaki; and Masubuchi, Masahiko, 4,995,347, Cl. 123-65.0BA.
Masui, Toshiyuki: *See*—
Kashida, Motokazu; Masui, Toshiyuki; Fukatsu, Tsutomu; Takei, Masahiro; Takahashi, Kouji; and Sasatani, Tomohiko, 4,996,607, Cl. 360-18.000.
Masukawa, Toyoaki; Uchida, Takashi; and Nakayama, Noritaka, to Konica Corporation. Silver halide photographic light-sensitive material containing novel cyan coupler. 4,996,139, Cl. 430-558.000.
Masuoka, Fujio: *See*—
Endoh, Tetsuo; Shirota, Riichiro; Momodomi, Masaki; Tanaka, Tomoharu; Masuoka, Fujio; and Watanabe, Shigeyoshi, 4,996,669, Cl. 365-185.000.
Maternaghan, Trevor J.: *See*—
Ficken, Geoffrey E.; Edwards, Douglas J.; Mowforth, Clive W.; Maternaghan, Trevor J.; Steiger, Rolf; and Dolden, Victor W., 4,996,141, Cl. 430-583.000.
Mathiaparanam, Ponnampalam, to Appleton Papers Inc. Bis-(indolyl-)ethylenes. 4,996,328, Cl. 548-427.000.
Mathur, Achint P., to Tranter, Inc. Plate heat exchanger with glueless gaskets. 4,995,455, Cl. 165-166.000.
Matravers, Peter, to Neutrogena Corporation. Method of treating diaper rash. 4,996,238, Cl. 514-865.000.
Matravers, Peter, to Neutrogena Corporation. Water resistant cream conditioner. 4,996,239, Cl. 514-873.000.
Matsuda, Hideo; Fujiwara, Takashi; Yokota, Yoshio; Kitagawa, Mitsuhiko; Iwasaki, Masami; and Watanuki, Kazuo, to Kabushiki Kaisha Toshiba. Crimp-type semiconductor device having non-alloy structure. 4,996,586, Cl. 357-74.000.
Matsuda, Shohei; Suzuki, Jiro; Sato, Tsuyoshi; and Tashima, Kazutoshi, to Honda Giken Kogyo Kabushiki Kaisha. Hydraulic braking pressure control system. 4,995,677, Cl. 303-113.000.
Matsuda, Toshihiko, to Marumanji Sangyo Co., Ltd. Cushion with heating pad. 4,995,126, Cl. 5-421.000.
Matsuhita Electric Industrial Co., Ltd.: *See*—
Jinkens, Joseph A., 4,995,678, Cl. 305-58.00R.
Matsui, Hideki; Hagiuda, Nobuyoshi; Yokonuma, Norikazu; Sakamoto, Hiroshi; and Iida, Yoshikazu, to Nikon Corporation. Shutter speed control device. 4,996,550, Cl. 354-420.000.
Matsui, Takeshi; Watanabe, Takehiko; Miyazaki, Katsunori; and Hayashi, Hiroo, to Toyo Boseki Kabushiki Kaisha. Heat-sensitive recording material. 4,996,182, Cl. 503-200.000.
Matsumaru, Hiroshi: *See*—
Fujiwara, Michio; Matsumaru, Hiroshi; Kobayashi, Yasushi; Sakai, Yoshio; Yoneda, Kenzi; Dohi, Osamu; and Noguchi, Akihiko, 4,995,479, Cl. 187-135.000.

Matsumora, Satoru: *See—*
Saito, Mitsuru; Matsumora, Satoru; and Watanabe, Yasushi, 4,996,005, Cl. 252-512.000.
Matsumoto, Fumio: *See—*
Tokuda, Kanji; Saeki, Yoshihiko; Sakamoto, Kiichiro; and Matsumoto, Fumio, 4,996,558, Cl. 355-50.000.
Matsumoto, Kazuhiko: *See—*
Hattori, Atsushi; Hanajima, Mabito; Moriyasu, Masaharu; Iwamoto, Toshikazu; and Matsumoto, Kazuhiko, 4,996,458, Cl. 313-402.000.
Matsumoto, Nobuki: *See—*
Nakadai, Yoshikazu; Taranishi, Daiya; Hirokawa, Koichi; and Matsumoto, Nobuki, 4,995,602, Cl. 271-207.000.
Matsumoto, Shoichi: *See—*
Yamamoto, Tomiaki; Murayama, Akio; Kondo, Susmu; Hato, Hitoshi; Kamagami, Shinichi; and Matsumoto, Shoichi, 4,995,704, Cl. 350-334.000.
Matsumoto, Shusaku; Hatakawa, Yoshio; and Nakajima, Akihiko, to Dai-Ichi Kogyo Seiyaku Co., Ltd. Process for recovering unreacted sucrose from reaction mixture in synthesis of sucrose fatty acid esters. 4,995,911, Cl. 127-48.000.
Matsumoto, Shusaku; Hatakawa, Yoshio; and Nakajima, Akihiko, to Dai-Ichi Kogyo Seiyaku Co., Ltd. Process for preparing sucrose fatty acid ester powder. 4,996,309, Cl. 536-119.000.
Matsunaga, Tsuyoshi: *See—*
Yoshinaka, Yasuo; Kuze, Katsuaki; Isaka, Tsutomu; Yamashita, Toshihiro; Matsuyama, Yujiro; Nakamura, Koichiro; Matsunaga, Tsuyoshi; and Makimura, Osamu, 4,996,291, Cl. 528-272.000.
Matsunaga, Yoshiyuki: *See—*
Nishida, Yasuaki; Iino, Yoshiki; Ohtake, Hiroshi; Abe, Masahide; Yoshikawa, Shigeo; Endo, Yukio; Matsunaga, Yoshiyuki; and Harada, Nozomu, 4,996,600, Cl. 358-213.220.
Matsuno, Kazumasa: *See—*
Takahashi, Toshio; Matsuno, Kazumasa; Morimoto, Masaru; and Ochiai, Fumio, 4,995,852, Cl. 474-91.000.
Matsuo: *See—*
Nakamura, Nobuto; Satoh, Hiroshi; Matsuo; and Esquivel, Misael U., 4,996,236, Cl. 514-659.000.
Matsuo, Shunji: *See—*
Morita, Shizuo; Matsuo, Shunji; Haneda, Satoshi; Fukuchi, Masakazu; and Shoji, Hisashi, 4,996,566, Cl. 355-246.000.
Matsuoka, Hiroshi: *See—*
Hasebe, Kanteru; Matsuoka, Hiroshi; and Yanagi, Kyotaro, 4,995,855, Cl. 474-167.000.
Matsuoka, Hiroyuki: *See—*
Kyutoku, Hirofumi; Matsuoka, Hiroyuki; and Otani, Yoshihisa, 4,996,102, Cl. 428-285.000.
Matsushima, Osamu: *See—*
Ishimoto, Satomi; Matsushima, Osamu; and Sakuma, Hajime, 4,996,639, Cl. 364-200.000.
Matsushita Electric Industrial Co. Ltd.: *See—*
Fujio, Katuharu, 4,995,789, Cl. 417-360.000.
Hatada, Kenzo, 4,996,583, Cl. 357-70.000.
Nomura, Noboru; Ueno, Atsushi; Hashimoto, Kazuhiko; and Kinoshita, Satoshi, 4,996,123, Cl. 430-20.000.
Ogawa, Kazufumi; Tamura, Hideharu; and Mino, Norihisa, 4,996,075, Cl. 427-12.000.
Okamura, Yasushi; Sosogi, Toshiro; and Takaki, Kosuke, 4,995,161, Cl. 29-568.000.
Shiomi, Yasufumi, 4,996,718, Cl. 455-323.000.
Tajima, Noriyuki; Ueno, Shigeto; and Sano, Tetsuhiro, 4,995,748, Cl. 400-691.000.
Matsushita Electric Works, Ltd.: *See—*
Uetsuki, Tadao, 4,996,465, Cl. 315-358.000.
Matsuura, Ikuya; and Yoshida, Yasushi, to Ube Industries, Ltd. Process for preparation of hydrocarbons. 4,996,382, Cl. 585-500.000.
Matsuura, Kazuo: *See—*
Sano, Akira; Kamiishi, Hirofumi; and Matsuura, Kazuo, 4,996,011, Cl. 264-28.000.
Matsuyama, Jinsho, to Canon Kabushiki Kaisha. Microwave plasma CVD apparatus for the formation of a large-area functional deposited film. 4,995,341, Cl. 118-723.000.
Matsuyama, Yujiro: *See—*
Yoshinaka, Yasuo; Kuze, Katsuaki; Isaka, Tsutomu; Yamashita, Toshihiro; Matsuyama, Yujiro; Nakamura, Koichiro; Matsunaga, Tsuyoshi; and Makimura, Osamu, 4,996,291, Cl. 528-272.000.
Matsuzaka, Syoji: *See—*
Nakayama, Tomoyuki; Hoshino, Hiroyuki; Ohtani, Hirofumi; and Matsuzaka, Syoji, 4,996,140, Cl. 430-569.000.
Matsuzaki, Eiichi: *See—*
Morita, Hirobumi; Matsuzaki, Eiichi; Chiba, Yukio; and Kato, Shigeo, 4,995,338, Cl. 118-410.000.
Matsuzaki, Hitomi: *See—*
Nakagawa, Hiroaki; and Matsuzaki, Hitomi, 4,996,106, Cl. 428-343.000.
Matthews, Lloyd P., to Motorola, Inc. Data processor circuit and method for controlling voltage variation of a dynamic node. 4,996,450, Cl. 307-449.000.
Matthys, Robert J.: *See—*
Bonne, Ulrich; and Matthys, Robert J., 4,996,431, Cl. 250-343.000.
Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V.: *See—*
Keilmann, Fritz, 4,996,505, Cl. 333-218.000.
May, Michael P.: *See—*
Gardner-Chavis, Ralph A.; and May, Michael P., 4,996,033, Cl. 423-249.000.
May, Peter T.; Strauch, Richard G.; and Weber, Bob L., to Univ. of Colo. Foundation, Inc.; and United States of America, Commerce. Single station radar ocean surface current mapper. 4,996,533, Cl. 342-108.000.
Mazda Motor Corporation: *See—*
Nishigami, Takashi; and Kado, Michio, 4,995,654, Cl. 292-216.000.
Sawasaki, Tomoo; and Morishige, Chitoshi, 4,995,283, Cl. 74-866.000.
Shigyo, Masatomo, 4,995,445, Cl. 164-305.000.
Mazuel, Claude, to Laboratoires Merck Sharp & Dohme-Chibret. Pharmaceutical and/or cosmetic composition for local use containing Rhamsan gum. 4,996,197, Cl. 514-54.000.
McAffer, Ian G. C.: *See—*
Rose, Howard; and McAffer, Ian G. C., 4,995,519, Cl. 215-32.000.
McAlister, Donald R.; and Ziebold, Steven A., to Monsanto Company. Heat recovery from concentrated sulfuric acid. 4,996,038, Cl. 423-522.000.
McCabe, David J., to Shaye Communications Limited. Waveform encoder. 4,996,696, Cl. 375-30.000.
McCaffrey, Felim: *See—*
Brisbin, Brian; McCaffrey, Felim; and Sheffield, Peter, 4,995,203, Cl. 52-6.000.
McCarthy, James R.: *See—*
Edwards, Michael L.; McCarthy, James R.; and Prakash, Nellikunja J., 4,996,308, Cl. 536-26.000.
McCarthy, Martin, to Fessler, Clyde. Mono-use syringe for hypodermic injections. 4,995,869, Cl. 604-110.000.
McCarthy, Peter A., to Pfizer Inc. Difluoroketones from difluoroacylsilanes. 4,996,345, Cl. 556-485.000.
McCauley, John R.: *See—*
Gortsema, Frank P.; McCauley, John R.; Pellet, Regis J.; Miller, James G.; and Rabo, Jule A., 4,995,964, Cl. 208-112.000.
McClintock, Jack M.: *See—*
Knittel, Gerald H.; Smith, Stanley D.; Spector, Richard C.; and McClintock, Jack M., 4,996,088, Cl. 428-40.000.
McConaghy, John S., Jr.: *See—*
Kalota, Dennis J.; McConaghy, John S., Jr.; Foerst, Paul W.; Liu, Paul H.; and Feher, Frank R., Jr., 4,996,369, Cl. 568-615.000.
McConnell, John W., Jr.: *See—*
Meikrantz, David H.; Bourne, Gary L.; McFee, John N.; Burdge, Bradley G.; and McConnell, John W., Jr., 4,995,916, Cl. 134-22.160.
McCulloch, Beth; and Gatter, Michael G., to UOP. Process for extracting meta-dichlorobenzene from isomer mixtures with mixed alkali metal exchanged X zeolite adsorbents. 4,996,380, Cl. 570-211.000.
McDaniel, David L.; and Petrick, Scott W., to General Electric Company. Apparatus and method for reading data from an image detector. 4,996,413, Cl. 250-208.100.
McDaniel, Robert S., Jr.; and Johnson, Donald L., to Henkel Kommanditgesellschaft auf Aktien. Glycoside preparation directly from aqueous saccharide solutions or syrups. 4,996,306, Cl. 536-18.600.
McFee, John N.: *See—*
Meikrantz, David H.; Bourne, Gary L.; McFee, John N.; Burdge, Bradley G.; and McConnell, John W., Jr., 4,995,916, Cl. 134-22.160.
McGahren, William J.; and Ellestad, George A., to American Cyanamid Company. Process for producing the antibiotic and antitumor agents LL-E33288ε-I and LL-E33288ε-Br. 4,996,305, Cl. 536-17.500.
McGeachy, Donald E.: *See—*
Bonacorsi, Dennis L.; McGeachy, Donald E.; and Smith, Alan L., 4,995,421, Cl. 137-383.000.
McGhie, James R. Detachable floating counterweight. 4,995,518, Cl. 212-178.000.
McHugh, George J., to AGF Manufacturing, Inc. Valve and arrangement for fire suppression water sprinkler system. 4,995,423, Cl. 137-559.000.
McIntosh, Robert H., to Interface Research Corporation. Microbiocidal fabric having phosphate derivatives and method of preparation thereof. 4,996,052, Cl. 424-404.000.
McIntyre, Frederic S., to Acumeter Laboratories, Inc. Product comprising substrate bearing continuous extruded fiber forming random crisscross pattern layer. 4,996,091, Cl. 428-113.000.
McKee, Jere L.; Thomas, Glenn R.; Gula, Lance; and Beatty, William E., Jr., to Westinghouse Electric Corp. CT quick change assembly and force transmitting spacer. 4,996,507, Cl. 335-195.000.
McKeown, Mark H.; and Beason, Steven C., to United States of America, Interior. Radial arm strike rail. 4,996,547, Cl. 354-81.000.
McManus, John R.: *See—*
Robertson, Gerald F.; Moyer, Ross A.; and McManus, John R., 4,995,252, Cl. 72-194.000.
McNett, John P.; and Mucaro, Sal, to Tiger Electronics, Inc. Bubble blowing figure toy. 4,995,844, Cl. 446-021.000.
McSparran, Ray A.; Moore, William S.; and Wooden, James R., to International Business Machines Corporation. Apparatus for detecting failure of thermal heaters in ink jet printers. 4,996,487, Cl. 324-549.000.
Mecke, Norbert; and Krauter, Heinrich, to Pelikan Aktiengesellschaft. Thermal print-transfer ribbon. 4,995,741, Cl. 400-120.000.
Medical Engineering Corporation: *See—*
Maerzke, James T.; and Trick, Robert E., 4,995,380, Cl. 128-79.000.
Medical Graphics Corporation: *See—*
Norlien, John A.; Huhn, James M.; and Crawford, A. Gerrit, 4,995,256, Cl. 73-31.040.
Meer Corporation: *See—*
Meer, E. Harvey; Mountain, Frank; and Schultz, Herbert V., 4,996,051, Cl. 424-195.100.

Meer, E. Harvey; Mountain, Frank; and Schultz, Herbert V., to Meer Corporation. Low calorie, high fiber laxative. 4,996,051, Cl. 424-195.100.
Mehaffey, Joseph L.; and Newman, Thomas C., to Akzo America Inc. Calcium carbonate beneficiation. 4,995,965, Cl. 209-166.000.
Meier, Wolfgang: *See*—
Huber, Jakob; and Meier, Wolfgang, 4,996,504, Cl. 333-81.00R.
Meikrantz, David H.; Bourne, Gary L.; McFee, John N.; Burdge, Bradley G.; and McConnell, John W., Jr., to United States of America, Energy. Method of recovering hazardous waste from phenolic resin filters. 4,995,916, Cl. 134-22.160.
Melberg, Steen G.: *See*—
Jensen, Ole J.; and Melberg, Steen G., 4,995,391, Cl. 128-635.000.
Melchior, Jean F. Two-stroke internal combustion engines and process for operating said engines. 4,995,348, Cl. 123-65.0VD.
Melmon, Kenneth L.; Goodman, Murray; Khan, Manzoor M.; Marr-Leisy, Debra; and Verlander, Michael, to Leland Stanford Junior University, The Board of Trustees of the. Histamine derivatives as immune modulators. 4,996,221, Cl. 514-399.000.
Menchetti, Robert J., to National Gypsum Company. Panels with laminated strips for clips. 4,995,215, Cl. 52-747.000.
Mendes, Etienne; Vernieres, Jean-Claude; Simiaud, Jacques; and Keane, Peter E., to SANOFI. Derivatives of 4-amino 3-carboxy naphthyridines and their pharmaceutical compositions. 4,996,213, Cl. 514-300.000.
Menke, Wilhlem, to NSM Apparatebau GmbH & Co. KG. Rental and vending machine, particularly for video cassettes, and cassette case for video cassettes. 4,995,498, Cl. 194-205.000.
Menzel, Stanley W. O., to Rib Loc Australia Pty. Ltd. Method of protecting conduits including helically winding a strip. 4,995,929, Cl. 156-187.000.
Mercado, Clara G.; and Krog, Ann M., to Revlon, Inc. Lipstick formulation and method. 4,996,044, Cl. 424-64.000.
Mercer, William B.: *See*—
Lebovits, Alexander; Yaeger, William L.; Mercer, William B.; and Dapp, Timothy L., 4,996,261, Cl. 525-131.000.
Merck & Co., Inc.: *See*—
Baldwin, John J.; and Remy, David C., 4,996,321, Cl. 546-194.000.
Biftu, Tesfaye; Bugianesi, Robert L.; Girotra, Nirindar N.; Ponpipom, Mitree M.; Sahoo, Soumya P.; and Kuo, Chan H., 4,996,203, Cl. 514-231.500.
Chang, Michael N.; Chiang, Yuan-Ching P.; Heck, James V.; and Lewis, Michael D., 4,996,231, Cl. 514-467.000.
Merck Sharp & Dohme Ltd.: *See*—
Baker, Raymond; Leeson, Paul D.; and Britcher, Susan F., 4,996,211, Cl. 514-289.000.
Merkle, Hans R.; and Fretschner, Erich, to BASF Aktiengesellschaft. Preparation of pyrazole and its derivatives. 4,996,327, Cl. 548-373.000.
Merrell Dow Pharmaceuticals Inc.: *See*—
Edwards, Michael L.; McCarthy, James R.; and Prakash, Nellikunja J., 4,996,308, Cl. 536-26.000.
Webb, Norval E.; and Hammer, Gregory V., 4,996,061, Cl. 424-475.000.
Merrem, Hans-Joachim: *See*—
Wilharm, Peter; Merrem, Hans-Joachim; and Pawlowski, Georg, 4,996,301, Cl. 534-556.000.
Merrison, John C.: *See*—
DeLange, Robert J.; and Merrison, John C., 4,996,469, Cl. 318-757.000.
Rowan, Timothy M.; and Merrison, John C., 4,996,470, Cl. 318-772.000.
Merz, Winfried; and Schmidt, Theo, to Lever Brothers Company. Process for the production of a film combination. 4,995,930, Cl. 156-209.000.
Messer Grieshiem GmbH: *See*—
Grohmann, Paul, 4,995,918, Cl. 148-9.00R.
Messerschmitt-Bolkow-Blohm GmbH: *See*—
Rieger, Robert; and Tilly, Bodo, 4,995,694, Cl. 350-96.190.
Metalpraecis Berchem & Schaberg Geselischaft fur Metallformgebung mit beschraankter Haftung: *See*—
Berchem, Rutger, 4,995,427, Cl. 138-155.000.
Metzner, Klaus, to Fresenius, AG. Measuring apparatus for determination of the activity or of the concentration of ions in solutions. 4,995,959, Cl. 204-411.000.
Meyer, Norbert: *See*—
Scholz, Herbert; Zeidler, Adolf; Wuerzer, Bruno; and Meyer, Norbert, 4,995,899, Cl. 71-92.000.
Meyer, Rolf-Volker: *See*—
Heinz, Hans-Detlef; Kohler, Burkhard; Meyer, Rolf-Volker; Reinking, Klaus; and Sommer, Alexa, 4,996,256, Cl. 524-112.000.
Meyerling, Wilfried: *See*—
von Borcke, Wulff-Eckard; and Meyerling, Wilfried, 4,995,201, Cl. 51-411.000.
Meyers, Bernard L.: *See*—
Haddad, Muin S.; Meyers, Bernard L.; and Eryman, William S., 4,996,179, Cl. 502-209.000.
Michael, George W.: *See*—
Couper, William D.; and Michael, George W., 4,995,837, Cl. 439-863.000.
Mickish, Daniel J.: *See*—
Armstrong, Mark L.; and Mickish, Daniel J., 4,995,685, Cl. 350-3.650.
Microelectronics and Computer Technology Corporation: *See*—
MacKay, Colin A., 4,995,551, Cl. 228-177.000.
Micron Technology, Inc.: *See*—
Chadwick, Gary L.; and Johnson, Joe F., 4,996,655, Cl. 364-550.000.
Microvena Corporation: *See*—
Amplatz, Kurt; and Kotula, Frank, 4,995,866, Cl. 604-53.000.
Midamerica Recycling Company: *See*—
Buer, Jeffrey J., 4,995,314, Cl. 100-152.000.
Middione, Jerome J.: *See*—
Droste, Timothy A.; Middione, Jerome J.; and Kher, Himat B., 4,995,971, Cl. 210-168.000.
Mieth, Hans O. Process for controlling the medium inlet into at least one leakage cavity of a valve and an apparatus for its performance. 4,995,416, Cl. 137-1.000.
Mikheev, Sergei M.; Zemerov, Valery N.; and Elshansky, Petr V. Method of monitoring the state of elongated object and apparatus for performing this method. 4,995,267, Cl. 73-800.000.
Miki, Hirofumi: *See*—
Kotegawa, Katsumi, deceased; Okuda, Yoshihiro; Uera, Masaru; and Miki, Hirofumi, 4,995,566, Cl. 242-77.200.
Miki, Hisaya: *See*—
Saeki, Kenji; Fukuhara, Hiroshi; Agoo, Tokinori; Taguchi, Toru; Miki, Hisaya; Haneda, Yutaka; and Yoshimoto, Sadao, 4,996,372, Cl. 568-717.000.
Mikkelsen, Jan; and Sorlie, Kjell, to Caterpillar Industrial Inc. Operator's station mounting arrangement and method. 4,995,469, Cl. 180-89.130.
Miles Inc.: *See*—
Buckler, Robert T.; and Hatch, Robert P., 4,996,332, Cl. 549-285.000.
Miller, Allen: *See*—
Becker, Earl M., Jr.; and Miller, Allen, 4,996,525, Cl. 340-825.310.
Miller, Gregory D.: *See*—
Diliello, Laura K.; Miller, Gregory D.; and Steele, Robert E., 4,995,692, Cl. 350-96.160.
Miller, James G.: *See*—
Gortsema, Frank P.; McCauley, John R.; Pellet, Regis J.; Miller, James G.; and Rabo, Jule A., 4,995,964, Cl. 208-112.000.
Miller, Joseph A., to Ethyl Corporation. Intramolecular migration reactions. 4,996,340, Cl. 556-190.000.
Miller, Lawrence F.: *See*—
Aldecoa, Julio A.; and Miller, Lawrence F., 4,996,128, Cl. 429-153.000.
Miller, Mildred A.: *See*—
Pierantozzi, Ronald; Miller, Mildred A.; Listemann, Mark L.; Gaffney, Thomas R.; and Coe, Charles G., 4,996,322, Cl. 564-216.000.
Miller, Neil T.: *See*—
Karger, Barry L.; Feibush, Binyamin; Miller, Neil T.; and Figueroa, Alvaro, 4,996,343, Cl. 556-445.000.
Millet, Jean: *See*—
Samreth, Soth; Bellamy, Francois; and Millet, Jean, 4,996,347, Cl. 558-411.000.
Millipore Corporation: *See*—
Gabriels, Joseph E., Jr., 4,996,154, Cl. 435-240.241.
Milton, Albert F.: *See*—
Noble, Milton L.; and Milton, Albert F., 4,996,427, Cl. 250-332.000.
Mimura, Tadao; and Kato, Yoshiaki, to Hitachi, Ltd. Atmospheric pressure ionization mass spectrometer. 4,996,424, Cl. 250-288.000.
Minami, Norio: *See*—
Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, 4,996,215, Cl. 514-316.000.
Minaskanian, Gevork; and Peck, James V., to Whitby Research, Inc. Penetration enhancers for transdermal delivery of systemic agents. 4,996,199, Cl. 514-167.000.
Mincy, John E.: *See*—
Goss, Michael; and Mincy, John E., 4,995,912, Cl. 134-2.000.
Minnesota Mining and Manufacturing Company: *See*—
Bronn, William R.; Silver, Spencer F.; and Joseph, Eugene G., 4,996,266, Cl. 525-271.000.
Francis, David J.; and Bastow, David R., 4,996,092, Cl. 428-157.000.
Franck, Gerald R.; and Olsen, David B., 4,995,452, Cl. 165-119.000.
Packard, Thomas J., 4,995,473, Cl. 181-137.000.
Rasmussen, Jerald K.; Heilmann, Steven M.; and Palensky, Frederick J., 4,996,243, Cl. 522-99.000.
Mino, Norihisa: *See*—
Ogawa, Kazufumi; Tamura, Hideharu; and Mino, Norihisa, 4,996,075, Cl. 427-12.000.
Minolta Camera Kabushiki Kaisha: *See*—
Anno, Masahiro; and Sano, Eiichi, 4,996,126, Cl. 430-106.600.
Hamakawa, Wataru, 4,996,568, Cl. 355-308.000.
Kamei, Nobuo; and Ikenoue, Yoshikazu, 4,996,649, Cl. 364-518.000.
Kawagoe, Nobukazu; Sugiyama, Masami; and Inaba, Masahito, 4,995,727, Cl. 356-402.000.
Mori, Shinichi; Hamada, Akiyoshi; Yagoto, Mitsutoshi; and Murakami, Masanori, 4,996,541, Cl. 346-108.000.
Mirage, James A., to Mirage, James A. (Airlock) bicycle helment with adjustable ventilation systems and accessories. 4,995,117, Cl. 2-410.000.
Miruri, Alberto G. Safety device for concealing apparatus. 4,995,680, Cl. 312-7.100.
Mishumi, Sadaharu: *See*—
Oshio, Hideki; Mishumi, Sadaharu; Yagii, Kiyoshi; Yoshikawa, Satoshi; and Murata, Katsuyoshi, 4,996,379, Cl. 570-176.000.

Mission Research Corporation: *See*—
Hendrick, Roy W., Jr., 4,996,437, Cl. 250-252.100.
Mita Industrial Co., Ltd.: *See*—
Mizude, Kazuhiro, 4,996,562, Cl. 355-205.000.
Okubo, Masayoshi; and Tsujihiro, Masami, 4,996,265, Cl. 525-242.000.
Sakamoto, Naoki; and Masanori, Itakiyo, 4,996,559, Cl. 355-56.000.
Mitchell, John H.: *See*—
Anafi, David; Mitchell, John H.; and Schall, Harold B., 4,996,412, Cl. 250-201.900.
Mitel Corporation: *See*—
Whitesel, J. Warren, 4,996,702, Cl. 379-1.000.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Arimori, Iwao, 4,996,601, Cl. 358-213.310.
Fukuchi, Hiroshi; Ishii, Mitsuaki; and Miyazaki, Masaaki, 4,996,644, Cl. 364-431.050.
Hara, Zenichiro, 4,996,598, Cl. 358-183.000.
Hattori, Atsushi; Hanajima, Mabito; Moriyasu, Masaharu; Iwamoto, Toshikazu; and Matsumoto, Kazuhiko, 4,996,458, Cl. 313-402.000.
Itai, Kosaku, 4,996,485, Cl. 324-415.000.
Iwata, Kazuo; Satou, Takuma; and Shibata, Satoru, 4,995,709, Cl. 350-447.000.
Kakuda, Masatoshi, 4,996,618, Cl. 360-106.000.
Kirimoto, Tetsuo; Fujisaka, Takahiko; and Ohashi, Yoshimasa, 4,996,532, Cl. 342-81.000.
Nagahama, Kohki, 4,996,582, Cl. 357-69.000.
Nagai, Seiichi; Ishii, Mitsuo; and Hasegawa, Kazuyoshi, 4,995,687, Cl. 350-96.200.
Nakayama, Yoshiro, 4,996,406, Cl. 219-69.120.
Ohkubo, Satoru; and Demizu, Akira, 4,995,351, Cl. 123-90.110.
Okamoto, Kyoichi; and Takami, Kazuo, 4,995,275, Cl. 74-7.00A.
Okutsu, Naohiro, 4,996,614, Cl. 360-103.000.
Ono, Fumitaka; and Semasa, Takayoshi, 4,996,602, Cl. 358-457.000.
Ozaki, Hiroji; and Nagao, Shigeo, 4,996,168, Cl. 437-164.000.
Shinomiya, Kohji, 4,996,417, Cl. 250-226.000.
Tsutsumi, Kiyohide, 4,995,938, Cl. 156-580.100.
Mitsubishi Denki Kabushiki Kaishi: *See*—
Kobayashi, Hiroo, 4,996,459, Cl. 313-467.000.
Mitsubishi Gas Chemical Company: *See*—
Hatakeyama, Hidetoshi; and Kashiba, Takashi, 4,996,068, Cl. 426-234.000.
Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See*—
Hiramatsu, Takeo; Fujita, Kenjiro; Nagayoshi, Yoshimasa; Hamasaki, Yoshiaki; and Kawai, Satoshi, 4,995,491, Cl. 192-58.00R.
Mitsubishi Kasei Corporation: *See*—
Kobayashi, Takaaki; Tosa, Takahumi; Sato, Hiroyuki; Okada, Hiroyoshi; Miyake, Masao; and Mori, Kenji, 4,996,067, Cl. 426-96.000.
Mitsubishi Metal Corporation: *See*—
Akutsu, Hidetoshi, 4,995,924, Cl. 148-433.000.
Mitsubishi Paper Mills, Limited: *See*—
Otani, Masaaki; Hiraishi, Shigetoshi; and Hyodo, Kenji, 4,996,183, Cl. 503-208.000.
Mitsubishi Petrochemical Co., Ltd.: *See*—
Kaitoh, Mitsumasa; and Mori, Shoichiro, 4,996,334, Cl. 549-364.000.
Mitsuhashi, Hiroshi: *See*—
Kimura, Masayuki; Hosaka, Kunio; Takeda, Shigehumi; and Mitsuhashi, Hiroshi, 4,996,331, Cl. 549-229.000.
Mitsuhashi, Masakazu; Sakai, Shuzo; and Miyake, Toshio, to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo. Novel desiccant and dehydration therewith. 4,996,196, Cl. 514-53.000.
Mitsui Petrochemical Industries, Ltd.: *See*—
Mizumoto, Kunihiko; Haruta, Koichi; and Kajiura, Hirokazu, 4,995,923, Cl. 148-304.000.
Nakagawa, Hiroaki; and Matsuzaki, Hitomi, 4,996,106, Cl. 428-343.000.
Saeki, Kenji; Fukuhara, Hiroshi; Agoo, Tokinori; Taguchi, Toru; Miki, Hisaya; Haneda, Yutaka; and Yoshimoto, Sadao, 4,996,372, Cl. 568-717.000.
Mitsui, Yasuhiro; Hasumi, Keiji; Watase, Shinichiro; Kuriyama, Katsumi; and Nakano, Kazuo, to Hitachi, Ltd.; and Hitachi Tokyo Electronics Co., Ltd. Mass spectrometer. 4,996,422, Cl. 250-281.000.
Miura, Tomoko: *See*—
Hirata, Keiichi; Kawakami, Yasushi; Miura, Tomoko; Mukai, Miyako; Ban, Tomohiro; and Furukawa, Akihiro, 4,995,739, Cl. 400-63.000.
Miwa, Matsuyuki: *See*—
Takemoto, Satoru; Kaneko, Rokusaburo; Miwa, Matsuyuki; and Makino, Seiji, 4,996,555, Cl. 355-44.000.
Miyagawa, Hideo: *See*—
Iwamoto, Katsuharu; Kawakami, Osamu; and Miyagawa, Hideo, 4,996,418, Cl. 250-227.110.
Miyake, Kazutoshi: *See*—
Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, 4,996,215, Cl. 514-316.000.
Miyake, Masao: *See*—
Kobayashi, Takaaki; Tosa, Takahumi; Sato, Hiroyuki; Okada, Hiroyoshi; Miyake, Masao; and Mori, Kenji, 4,996,067, Cl. 426-96.000.
Miyake, Toshio: *See*—
Mitsuhashi, Masakazu; Sakai, Shuzo; and Miyake, Toshio, 4,996,196, Cl. 514-53.000.
Miyaoka, Senri: *See*—
Murano, Kanji; and Miyaoka, Senri, 4,996,667, Cl. 365-117.000.
Miyata, Gary T.: *See*—
Brown, Donald G.; and Miyata, Gary T., 4,995,644, Cl. 285-41.000.
Miyauchi, Teruhiko: *See*—
Tokuhiro, Tomoya; Koibuchi, Nobutaka; Miyauchi, Teruhiko; Kikuchi, Koshin; Hirokawa, Jun; Yamashiro, Kunio; Nishizuka, Sakae; Watanabe, Ippei; Maruo, Shozo; Tsutsui, Yohichiro; and Ishikawa, Sadahito, 4,995,765, Cl. 406-117.000.
Miyazaki, Katsunori: *See*—
Matsui, Takeshi; Watanabe, Takehiko; Miyazaki, Katsunori; and Hayashi, Hiroo, 4,996,182, Cl. 503-200.000.
Miyazaki, Masaaki: *See*—
Fukuchi, Hiroshi; Ishii, Mitsuaki; and Miyazaki, Masaaki, 4,996,644, Cl. 364-431.050.
Miyazaki, Takeshi: *See*—
Yoshinaga, Kazuo; Miyazaki, Takeshi; Ohnishi, Toshikazu; Kurabayashi, Yutaka; Takasu, Yoshio; and Kobayashi, Tadashi, 4,995,705, Cl. 350-350.00S.
Miyoshi, Takahito; Kanazawa, Minoru; Sugisaki, Tsutomu; Yamada, Takuzi; and Okuzawa, Yasutoshi, to Fuji Photo Film Co., Ltd. Magnetic tape cassette having improved guide pole structure. 4,995,199, Cl. 51-326.000.
Mizude, Kazuhiro, to Mita Industrial Co., Ltd. Control device in image forming apparatus. 4,996,562, Cl. 355-205.000.
Mizuhashi, Mamoru: *See*—
Oyama, Takuji; Suzuki, Koichi; and Mizuhashi, Mamoru, 4,996,105, Cl. 428-336.000.
Mizumoto, Kunihiko; Haruta, Koichi; and Kajiura, Hirokazu, to Mitsui Petrochemical Industries, Ltd. Thin film of amorphous alloy. 4,995,923, Cl. 148-304.000.
Moagon AG: *See*—
Lunden, Goran, 4,995,169, Cl. 33-534.000.
Mobil Oil Corporation: *See*—
Degnan, Thomas F., Jr.; and Landis, Michael E., 4,995,962, Cl. 208-110.000.
Dutt, William M., 4,996,094, Cl. 428-212.000.
Pelrine, Bruce P.; and Wu, Margaret M., 4,996,384, Cl. 585-530.000.
Pickering, John L., Jr.; and Nemet-Mavrodin, Margaret, 4,996,381, Cl. 585-413.000.
Mockford, Mary J.: *See*—
Birchall, James D.; Mockford, Mary J.; and Stanley, David R., 4,996,174, Cl. 501-87.000.
Modrek, Borzo, to 3D Systems, Inc. Methods and apparatus for production of three-dimensional objects by stereolithography. 4,996,010, Cl. 264-22.000.
Mohacsi, Erno, to Hoffmann-La Roche Inc. Enantiomers of β-[(2-amino-1-naphthalenyl) thiol]-α-hydroxy-4-methoxybenzene propanoic acid. 4,996,352, Cl. 562-401.000.
Mohammed, Jihan J.: *See*—
Thommen, Robert L.; and Mohammed, Jihan J., 4,995,832, Cl. 439-578.000.
Mohn, Michael F., to Betz Laboratories, Inc. Wastewater treatment using magnesium silicate. 4,995,986, Cl. 210-717.000.
Mohnhaupt, Elmer J. Portable commode. 4,995,122, Cl. 4-483.000.
Molecular Technology Corporation: *See*—
Gardner-Chavis, Ralph A.; and May, Michael P., 4,996,033, Cl. 423-249.000.
Moller, Rainer; Pretscher, Manfred; and Schmidt, Anton, to FAG Kugelfischer Georg Schafer (KGaA). Axial anti-friction bearing. 4,995,737, Cl. 384-607.000.
Molzahn, David C.: *See*—
Bowman, Robert G.; Molzahn, David C.; and Hartwell, George E., 4,996,363, Cl. 564-470.000.
Momodomi, Masaki: *See*—
Endoh, Tetsuo; Shirota, Riichiro; Momodomi, Masaki; Tanaka, Tomoharu; Masuoka, Fujio; and Watanabe, Shigeyoshi, 4,996,669, Cl. 365-185.000.
Mon, George, to United States of America, Army. Vortex flowmeter having an asymmetric center body. 4,995,269, Cl. 73-861.220.
Monahan, Patrick H. Mop connector. 4,995,134, Cl. 15-151.000.
Monat, Robert A.: *See*—
Monat, Seymour M.; and Monat, Robert A., 4,996,493, Cl. 324-699.000.
Monat, Seymour M.; and Monat, Robert A. Instantaneous ice detection system. 4,996,493, Cl. 324-699.000.
Monheim, Donald P. Apparatus and method for securing a tubular workpiece in position on a support. 4,995,578, Cl. 248-210.000.
Monroe Auto Equipment Company: *See*—
Guy, Yoram, 4,995,635, Cl. 280-707.000.
Monroe, Bruce M.: *See*—
Smothers, Willaim K.; Monroe, Bruce M.; and Chan, Dominic M., 4,996,120, Cl. 430-2.000.
Monsanto Company: *See*—
Fleet, George W. J.; Winchester, Bryan; and Carpenter, Neil M., 4,996,329, Cl. 548-453.000.
Kalota, Dennis J.; McConaghy, John S., Jr.; Foerst, Paul W.; Liu, Paul H.; and Feher, Frank R., Jr., 4,996,369, Cl. 568-615.000.
McAlister, Donald R.; and Ziebold, Steven A., 4,996,038, Cl. 423-522.000.
Monsees, Barbara S.: *See*—
Destouet, Judy M.; Eichling, John O.; Gilula, Louis A.; Monsees, Barbara S.; and Young, Vernon L., 4,995,882, Cl. 623-8.000.

Montague, Harry D. Foldable tandem bicycle. 4,995,626, Cl. 280-231.000.

Montanari, Dennis: *See—*
Tustison, Randal W.; Montanari, Dennis; Varitimos, Thomas; and diBenedetto, Bernard, 4,995,684, Cl. 350-1.600.

Montgomery, Robert D.; and Hull, Harold L. Electrician's combination tool. 4,995,128, Cl. 7-127.000.

Moore, Colin R.: *See—*
Bevan, Leonard N.; Moore, Colin R.; and Alkinson, Victor G., 4,996,184, Cl. 503-226.000.

Moore, Kevin D.: *See—*
Yourgalite, Ray A.; Moore, Malcolm; Chamberlain, Neal C.; Becicka, Kenneth F.; Hilgeman, Samuel J.; and Moore, Kevin D., 4,995,224, Cl. 53-540.000.

Moore, Malcolm: *See—*
Yourgalite, Ray A.; Moore, Malcolm; Chamberlain, Neal C.; Becicka, Kenneth F.; Hilgeman, Samuel J.; and Moore, Kevin D., 4,995,224, Cl. 53-540.000.

Moore, Richard D.: *See—*
Colonias, Karen W.; Commins, Alfred D.; Gilb, Tyrell T.; Lin, Jin-Jie; and Moore, Richard D., 4,995,206, Cl. 52-297.000.

Moore, Richard E.; Furusawa, Eiichi; Norton, Ted R.; Patterson, Gregory M. L.; and Mynderse, Jon S., to University of Hawaii; and Eli Lilly and Company. Scytophycins. 4,996,229, Cl. 514-450.000.

Moore, Ronald L.: *See—*
Sedgeley, William A.; and Moore, Ronald L., 4,995,771, Cl. 414-412.000.

Moore, William S.: *See—*
McSparran, Ray A.; Moore, William S.; and Wooden, James R., 4,996,487, Cl. 324-549.000.

Moorehead, Harvey R.: *See—*
Nichols, Colin J.; Nordgren, Gregory N.; and Moorehead, Harvey R., 4,995,863, Cl. 604-247.000.

Moos, Walter H.: *See—*
Bergmeier, Stephen C.; Kester, Jeffrey A.; Moos, Walter H.; Tecle, Haile; and Thomas, Anthony J., 4,996,201, Cl. 514-212.000.

MOR/ryde, Inc.: *See—*
Hall, Ron E., and Heitzmann, David E., 4,995,636, Cl. 180-716.000.

Morales, Rendell A., to Chainlight International S.A. Lighting string. 4,995,823, Cl. 439-226.000.

Moran, John C.: *See—*
Weisenbarger, Gale M.; and Moran, John C., 4,995,425, Cl. 137-827.000.

Morawietz, Hans, to Ciba-Geigy Corp. Concentrated aqueous dye solutions for dyeing paper. 4,995,885, Cl. 8-527.000.

Morey, William W., to United Technologies Corporation. Distributed multiplexed optical fiber Bragg grating sensor arrangeement. 4,996,419, Cl. 250-227.180.

Morgan Adhesives Co.: *See—*
Knittel, Gerald H.; Smith, Stanley D.; Spector, Richard C.; and McClintock, Jack M., 4,996,088, Cl. 428-40.000.

Morgan, James N.; and Rivers-Bland, Simon A. S., to Marler Haley Exposystems Limited. Collapsible framework. 4,995,212, Cl. 52-646.000.

Morgan, Leon R., executor: *See—*
Laurence, Roger F., deceased; and Morgan, Leon R., executor, 4,996,712, Cl. 381-68.400.

Mori, Kei. Light radiation stand. 4,995,712, Cl. 350-603.000.

Mori, Kenji: *See—*
Kobayashi, Takaaki; Tosa, Takahumi; Sato, Hiroyuki; Okada, Hiroyoshi; Miyake, Masao; and Mori, Kenji, 4,996,067, Cl. 426-96.000.

Mori, Shinichi; Hamada, Akiyoshi; Yagoto, Mitsutoshi; and Murakami, Masanori, to Minolta Camera Kabushiki Kaisha. Film conveying apparatus. 4,996,541, Cl. 346-108.000.

Mori, Shoichiro: *See—*
Kaitoh, Mitsumasa; and Mori, Shoichiro, 4,996,334, Cl. 549-364.000.

Mori, Toshihiro: *See—*
Yamashita, Tsuyoshi; Kobayashi, Goro; Nakamura, Hisanori; Shibata, Youichi; and Mori, Toshihiro, 4,996,683, Cl. 370-4.000.

Morikawa, Koji, to Fuji Jukogyo Kabushiki Kaisha. Two-cycle engine. 4,995,354, Cl. 123-65.00V.

Morimoto, Masaru: *See—*
Takahashi, Toshio; Matsuno, Kazumasa; Morimoto, Masaru; and Ochiai, Fumio, 4,995,852, Cl. 474-91.000.

Morimoto, Yoshinari: *See—*
Yamada, Shiro; Hirata, Keiichi; Oishi, Minoru; Morimoto, Yoshinari; Furukawa, Akihiro; and Kawasumi, Atsuko, 4,996,640, Cl. 364-200.000.

Morishige, Chitoshi: *See—*
Sawasaki, Tomoo; and Morishige, Chitoshi, 4,995,283, Cl. 74-866.000.

Morita, Hirobumi; Matsuzaki, Eiichi; Chiba, Yukio; and Kato, Shigeo, to Honda Giken Kogyo Kabushiki Kaisha. Coating apparatus. 4,995,338, Cl. 118-410.000.

Morita, Shizuo; Matsuo, Shunji; Haneda, Satoshi; Fukuchi, Masakazu; and Shoji, Hisashi, to Konica Corporation. Multicolor image forming apparatus with separately removable and insertable assembly units. 4,996,566, Cl. 355-246.000.

Morita, Toshiya; Kita, Sumio; and Kamada, Hiroshi, to Sharp Kabushiki Kaisha. System for displaying image of extended area. 4,996,652, Cl. 364-521.000.

Moriyasu, Masaharu: *See—*
Hattori, Atsushi; Hanajima, Mabito; Moriyasu, Masaharu; Iwamoto, Toshikazu; and Matsumoto, Kazuhiko, 4,996,458, Cl. 313-402.000.

Morley, Robert S.; Smith, Roland A.; and Sayre, Paul D., to Northern Telecom Limited. Electronic systems and effective reduction of electromagnetic interference energy propagation from electronic systems. 4,996,684, Cl. 370-100.100.

Morokuma, Kazunori: *See—*
Ginnaga, Akihiro; Morokuma, Kazunori; Aihara, Katsutoshi; and Sakoh, Mitsuo, 4,996,299, Cl. 530-409.000.

Morrison, S. Roy: *See—*
Divigalpitiya, W. M. Ranjith; Frindt, Robert F.; and Morrison, S. Roy, 4,996,108, Cl. 428-411.100.

Morsch, Joachim: *See—*
Gensberger, Karl; and Morsch, Joachim, 4,995,586, Cl. 251-30.040.

Morton International, Inc.: *See—*
Lazarus, Richard M.; Reardon, Edward J.; and Dixit, Sunit S., 4,996,122, Cl. 430-17.000.
O'Connell, Daniel, 4,996,260, Cl. 524-381.000.

Moseley, Douglas D.; and Ruof, Edgar J., to Aircraft Braking Systems Corporation. Motor position feedback controlled electrically actuated aircraft brake. 4,995,483, Cl. 188-162.000.

Moser, Frank H.; and Lynam, Niall R., to Donnelly Corporation. Method for deposition of electrochromic layers. 4,996,083, Cl. 427-108.000.

Moslehi, Mehrdad M.; and Huang, Steve S., to Texas Instruments Incorporated. Distributed ECR remote plasma processing and apparatus. 4,996,077, Cl. 427-38.000.

Mosley, Alan: *See—*
Nicholas, Beatrice M.; Mosley, Alan; Hilsum, Cyril; and Clark, Michael G., 4,996,104, Cl. 428-323.000.

Motoi, Toshihiro; Nakazawa, Toshihiko; Takesue, Toshihiro; Takahashi, Satoshi; and Murahashi, Takashi, to Konica Corporation. Recorder with ligament supported scan mirror and resilient optical system support. 4,996,540, Cl. 346-108.000.

Motojima, Hideaki; and Kamasaki, Keiji, to Kabushiki Kaisha Toshiba. Semiconductor device. 4,996,578, Cl. 357-30.000.

Motorola, Inc.: *See—*
Abdi, Behrooz L., 4,996,448, Cl. 307-351.000.
Baird, John, 4,996,170, Cl. 437-219.000.
Connell, Lawrence E., 4,996,529, Cl. 341-118.000.
Davis, James L.; Pennisi, Robert W.; Nounou, Fadia; and Landreth, Bobby D., 4,995,921, Cl. 148-22.000.
DeLuca, Michael J., 4,996,526, Cl. 340-825.440.
Hanna, John E., 4,996,498, Cl. 330-258.000.
Kommrusch, Richard S., 4,996,188, Cl. 505-1.000.
Matthews, Lloyd P., 4,996,450, Cl. 307-449.000.
Talgam, Yoav; Reed, Paul A.; Haddad, Elie; and Klingshirn, James A., 4,996,641, Cl. 364-200.000.
Yee, Renwin J., 4,995,953, Cl. 204-129.300.

Moulin, Michel; and Baseggio, Marcello. Precision medium handling system and method for a recorder. 4,996,543, Cl. 354-5.000.

Mountain, Frank: *See—*
Meer, E. Harvey; Mountain, Frank; and Schultz, Herbert V., 4,996,051, Cl. 424-195.100.

Moussavi, Mehdi; and Secourgeon, Liliane, to Commissariat a. l'Energie Atomique. Octasubstituted lithium phthalocyanines, their method of preparation and their use in EPR (electronic paramagnetic resonance) magnetometry. 4,996,311, Cl. 540-139.000.

Mowforth, Clive W.: *See—*
Ficken, Geoffrey E.; Edwards, Douglas J.; Mowforth, Clive W.; Maternaghan, Trevor J.; Steiger, Rolf; and Dolden, Victor W., 4,996,141, Cl. 430-583.000.

Moyer, Ross A.: *See—*
Robertson, Gerald F.; Moyer, Ross A.; and McManus, John R., 4,995,252, Cl. 72-194.000.

MPC, Metal Process Control A.B.: *See—*
Verbik, Robert M., 4,995,594, Cl. 266-272.000.

Mucaro, Sal: *See—*
McNett, John P.; and Mucaro, Sal, 4,995,844, Cl. 446-021.000.

Mugnier, Jean-Francois, to Poma of America, Inc. Sheave train assembly for cable transportation systems. 4,995,319, Cl. 104-112.000.

Mugnolo, Anthony: *See—*
Mugnolo, Frank A.; Mugnolo, Anthony; and Calabrese, Joseph A., 4,995,652, Cl. 292-202.000.

Mugnolo, Frank A.; Mugnolo, Anthony; and Calabrese, Joseph A., to Mugnolo, Frank A. Door latch. 4,995,652, Cl. 292-202.000.

Mukai, Miyako: *See—*
Hirata, Keiichi; Kawakami, Yasushi; Miura, Tomoko; Mukai, Miyako; Ban, Tomohiro; and Furukawa, Akihiro, 4,995,739, Cl. 400-63.000.

Mulholland, Bruce M., to Hoechst Celanese Corporation. UV-light stabilized polyoxymethylene molding compositions. 4,996,253, Cl. 524-91.000.

Muller, Dietmar; Bauer, Helmut; Franken, Harald; and Seiter, Harry, to Fraunhofer-Gesellschaft zur Forderung der angewandten Forschung e.V. Apparatus for extruding plastic materials. 4,995,802, Cl. 425-154.000.

Muller, Torsten, to U.S. Philips Corporation. Method and device for aligning and storing in a given order moldings having a tubular perforation. 4,995,779, Cl. 414-27.000.

Multi-Flow Tube, Inc.: *See—*
Plowman, Jeffrey D.; and Plowman, Arnold H., 4,995,759, Cl. 405-43.000.

Munakata, Hideyuki: *See*—
Yoshida, Kinoto; Fujii, Morizumi; Tsuda, Tokihiro; Suda, Shigeo; Kodama, Osamu; Kuroe, Kazuro; Tanikawa, Takumi; Nishimura, Michihiko; and Munakata, Hideyuki, 4,995,932, Cl. 156-242.000.

Murahashi, Takashi: *See*—
Motoi, Toshihiro; Nakazawa, Toshihiko; Takesue, Toshihiro; Takahashi, Satoshi; and Murahashi, Takashi, 4,996,540, Cl. 346-108.000.

Murai, Kazuhiro; Kawashima, Yasuhiko; Takada, Shun; and Kagawa, Nobuaki, to Konica Corporation. Silver halide photographic light-sensitive material. 4,996,138, Cl. 430-522.000.

Murai, Koichi: *See*—
Hasegawa, Yukinobu; Shimomura, Hiroyoshi; Murai, Koichi; Maruyama, Masatoshi; and Tange, Toyokichi, 4,996,127, Cl. 430-109.000.

Muraishi, Noboru. Motor vehicle work platform. 4,995,637, Cl. 280-727.000.

Murakami, Masanori: *See*—
Mori, Shinichi; Hamada, Akiyoshi; Yagoto, Mitsutoshi; and Murakami, Masanori, 4,996,541, Cl. 346-108.000.

Muramatsu, Tadao: *See*—
Hyodo, Youichi; Muramatsu, Tadao; and Hattori, Takaji, 4,995,755, Cl. 403-133.000.

Murano, Kanji; and Miyaoka, Senri, to Sony Corporation. Electron beam addressible recording device utilizing ferroelectric recording material. 4,996,667, Cl. 365-117.000.

Murase, Masanori: *See*—
Sakaguchi, Yasuo; Takegawa, Ichiro; Takemoto, Makoto; and Murase, Masanori, 4,996,125, Cl. 430-66.000.

Murase, Shinji: *See*—
Enoki, Yasutaka; Makino, Shigeo; and Murase, Shinji, 4,995,437, Cl. 152-209.00R.

Murata, Katsuyoshi: *See*—
Oshio, Hideki; Mishumi, Sadaharu; Yagii, Kiyoshi; Yoshikawa, Satoshi; and Murata, Katsuyoshi, 4,996,379, Cl. 570-176.000.

Murata Kikai Kabushiki Kaisha: *See*—
Koga, Toshiaki; and Hatakeyama, Yasunori, 4,995,562, Cl. 242-35.6DE.
Tone, Shoichi; and Kiriake, Masaharu, 4,995,230, Cl. 57-281.000.

Murata Manufacturing Co., Ltd.: *See*—
Ishikawa, Youhei; Hiratsuka, Toshiro; Abe, Hirotsugu; Takagaki, Hisashi; and Yamashita, Sadao, 4,996,506, Cl. 333-219.100.

Murayama, Akio: *See*—
Yamamoto, Tomiaki; Murayama, Akio; Kondo, Susmu; Hato, Hitoshi; Kamagami, Shinichi; and Matsumoto, Shoichi, 4,995,704, Cl. 350-334.000.

Murayama, Noboru, to Ricoh Company, Ltd. Dynamic image transmission system. 4,996,594, Cl. 358-136.000.

Murphy, Edward J.: *See*—
Noren, Gerry K.; Krajewski, John J.; and Murphy, Edward J., 4,996,282, Cl. 528-75.000.

Mushaben, Thomas G.: *See*—
Leist, Alan R.; Mushaben, Thomas G.; and Youtsey, Thomas E., 4,995,441, Cl. 160-229.100.

Mussack, Kevin R., to Golden Eagle Archery, Inc. Cable and bow-string retainer arrangement for compound archery bow. 4,995,373, Cl. 124-25.600.

Muto, Tadashi: *See*—
Kume, Hitoshi; Kamigaki, Yoshiaki; Adachi, Tetsuo; Tsukada, Toshihisa; Komori, Kazuhiro; Nishimoto, Toshiaki; Muto, Tadashi; and Koizumi, Toshiko, 4,996,571, Cl. 357-23.500.

Mycogen Corporation: *See*—
Sick, August J.; and Gilroy, Thomas E., 4,996,155, Cl. 435-252.300.

Myers, James R., to Hughes Aircraft Company. Fiber optic canister having orthotropic, controlled thermal expansion bobbin. 4,995,698, Cl. 350-96.290.

Mylari, Banavara L.; and Zembrowski, William J., to Pfizer Inc. Pyrido[2,3-d]pyridazinones as aloose reductase inhibitors. 4,996,204, Cl. 514-248.000.

Mynderse, Jon S.: *See*—
Moore, Richard E.; Furusawa, Eiichi; Norton, Ted R.; Patterson, Gregory M. L.; and Mynderse, Jon S., 4,996,229, Cl. 514-450.000.

Nadeau-Dostie, Benoit: *See*—
Wilcox, Philip S.; Nadeau-Dostie, Benoit; and Agarwal, Vinod K., 4,996,691, Cl. 371-68.100.

Naegeli, Robert W.: *See*—
Hahn, Norbert; and Naegeli, Robert W., 4,995,130, Cl. 14-71.300.

Nafisi-Movaghar, Karim, to Del Monte Corporation. Natural fruit flavor extracts. 4,996,070, Cl. 426-330.500.

Nafziger, John L.; and Hazelrigg, Mark J., to Dow Chemical Company, The. Process for reducing the quantity of hydrolyzable chlorides in isocyanates. 4,996,351, Cl. 560-352.000.

Nagahama, Kohki, to Mitsubishi Denki Kabushiki Kaisha. Field effect transistor for microstrip mounting and microstrip-mounted transistor assembly. 4,996,582, Cl. 357-69.000.

Nagahata, Satoru: *See*—
Nakaya, Toshiharu; Nagahata, Satoru; Konishi, Sakuichi; and Kuwano, Koichi, 4,996,076, Cl. 427-38.000.

Nagai, Ryo: *See*—
Saito, Osamu; Kamezaki, Hisamitsu; Suenaga, Masashi; Nagai, Ryo; Iuchi, Shinichiro; Watanabe, Hitoshi; and Fujiwara, Hideo, 4,996,089, Cl. 428-64.000.

Nagai, Seiichi; Ishii, Mitsuo; and Hasegawa, Kazuyoshi, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor laser device and a method of producing same. 4,995,687, Cl. 350-96.200.

Nagano, Yousuke: *See*—
Ishino, Takashi; Hiyama, Isao; Nagano, Yousuke; Shikamori, Tamotu; Turuta, Shizuo; Kamano, Toshiyasu; and Ohsugi, Hiroshi, 4,995,247, Cl. 68-12.00R.

Nagao, Shigeo: *See*—
Ozaki, Hiroji; and Nagao, Shigeo, 4,996,168, Cl. 437-164.000.

Nagaoka, Hitoshi: *See*—
Tsukamoto, Shin-ichi; Nagaoka, Hitoshi; Usuda, Shinji; Harada, Masatomi; and Tamura, Toshinari, 4,996,210, Cl. 514-278.000.

Nagata, Tatsuya; Watanabe, Michihiro; Hara, Eiichi; and Yamada, Takehiko, to Hitachi, Ltd. Line image sensor with controlled photosensitivity. 4,996,438, Cl. 250-211.00R.

Nagayoshi, Yoshimasa: *See*—
Hiramatsu, Takeo; Fujita, Kenjiro; Nagayoshi, Yoshimasa; Hamasaki, Yoshiaki; and Kawai, Satoshi, 4,995,491, Cl. 192-58.00R.

Nagura, Hiroyuki: *See*—
Tate, Takuo; Watanabe, Taketoshi; and Nagura, Hiroyuki, 4,995,428, Cl. 139-383.00A.

Nair, Madhavan G.; and Abraham, Ann. Three new non-polyglutamatable deazaaminopterins. 4,996,207, Cl. 514-258.000.

Naito, Hidefumi; Sarugaku, Toshio; and Tokuhara, Masaharu, to Sony Corporation. Flicker reduction apparatus. 4,996,595, Cl. 358-150.000.

Naito, Seishi; and Hayashi, Masaaki, to Glory Kogyo Kabushiki Kaisha. Multichannel magnetic and optical linear head. 4,996,677, Cl. 369-14.000.

Nakachi, Takeshi; Hata, Akio; and Watanabe, Yoshihisa, to Sekisui Kagaku Kogyo Kabushiki Kaisha. Resin used for magnetic recording media and a method for the production of the same. 4,996,272, Cl. 526-62.000.

Nakada, Kazuhiro, to NEC Corporation. Semiconductor device having a reverse bias voltage generator. 4,996,446, Cl. 307-296.200.

Nakada, Toshio; Takemura, Fumio; Sema, Yoshihito; and Kataoka, Kazuhito, to Tokai Carbon Co., Ltd. Method of producing magnetic carbon black. 4,995,999, Cl. 252-62.550.

Nakadai, Yoshikazu; Taranishi, Daiya; Hirokawa, Koichi; and Matsumoto, Nobuki, to Ricoh Company, Ltd. Facsimile device. 4,995,602, Cl. 271-207.000.

Nakagawa, Hiroaki; and Matsuzaki, Hitomi, to Mitsui Petrochemical Industries, Ltd. Pellicle. 4,996,106, Cl. 428-343.000.

Nakajima, Akihiko: *See*—
Matsumoto, Shusaku; Hatakawa, Yoshio; and Nakajima, Akihiko, 4,995,911, Cl. 127-48.000.
Matsumoto, Shusaku; Hatakawa, Yoshio; and Nakajima, Akihiko, 4,996,309, Cl. 536-119.000.

Nakajima, Susumu: *See*—
Sakata, Isao; Nakajima, Susumu; Koshimizu, Koichi; Samejima, Natsuki; Inohara, Kazumi; Takata, Hiroyuki; Yamauchi, Hirohiko; Ueda, Nobuo; and Hazue, Masaaki, 4,996,312, Cl. 540-145.000.

Nakajima, Toshio: *See*—
Nasu, Rikuo; Komyoji, Terumasa; Nakajima, Toshio; Suzuki, Kazumi; Ito, Keiichiro; Oshima, Takeshi; and Yoshimura, Hideshi, 4,995,898, Cl. 71-90.000.

Nakamura, Hideo: *See*—
Yamaguchi, Noboru; Nakamura, Hideo; Hagiwara, Yoshimune; Sato, Tsukasa; and Koizumi, Haruo, 4,996,659, Cl. 364-579.000.

Nakamura, Hisanori: *See*—
Yamashita, Tsuyoshi; Kobayashi, Goro; Nakamura, Hisanori; Shibata, Youichi; and Mori, Toshihiro, 4,996,683, Cl. 370-4.000.

Nakamura, Kenji: *See*—
Takahashi, Yoshio; Sudo, Mitsuo; Arikawa, Takamasa; Nakamura, Kenji; Sato, Izumi; Onogi, Katsuyuki; Iura, Takao; and Ishida, Nobuji, 4,995,505, Cl. 198-468.400.

Nakamura, Koichiro: *See*—
Yoshinaka, Yasuo; Kuze, Katsuaki; Isaka, Tsutomu; Yamashita, Toshihiro; Matsuyama, Yujiro; Nakamura, Koichiro; Matsunaga, Tsuyoshi; and Makimura, Osamu, 4,996,291, Cl. 528-272.000.

Nakamura, Kokichi: *See*—
Hashida, Hideo; Kanno, Hideki; Okada, Senri; Nakamura, Kokichi; and Sumimoto, Haruyoshi, 4,996,402, Cl. 219-10.410.

Nakamura, Kouji; and Akeda, Mamoru, to NHK Spring Co., Ltd. Sealing structure of an accumulator. 4,995,485, Cl. 188-322.170.

Nakamura, Masayuki; Katayama, Kazuyuki; and Furuhashi, Yasuhiro, to Nippondenso Co., Ltd.; and Hino Jidosha Kogyo Kabushiki Kaisha. Fuel injection timing apparatus. 4,995,368, Cl. 123-501.000.

Nakamura, Nobuto; Satoh, Hiroshi; Matsuo; and Esquivel, Misael U., to Takeda Chemical Industries, Ltd. Therapeutic composition for hepatic encephalopathy. 4,996,236, Cl. 514-659.000.

Nakamura, Norihiko: *See*—
Tate, Takao; Nakamura, Norihiko; Noguchi, Hiroshi; Kawagoe, Michio; Baika, Toyokazu; Kato, Kichiro; Kido, Yoshio; Hirose, Katsuhiko; Nihei, Hiroaki; and Masubuchi, Masahiko, 4,995,347, Cl. 123-65.0BA.

Nakamura, Shigeo: *See*—
Yokoi, Takeshi; Nakamura, Shigeo; and Yamanaka, Hiroshi, 4,995,745, Cl. 400-605.000.

Nakamura, Yoshikatsu: *See*—
Shindo, Norikazu; Sekine, Tomoyuki; Nakamura, Yoshikatsu; and Kawamoto, Takashi, 4,996,022, Cl. 419-2.000.

Nakamura, Yozo: *See*—
Okamoto, Yoshio; Nakamura, Yozo; Uchiyama, Kyoichi; Watanabe, Haruo; Kosuge, Tokuo; Onishi, Akira; Terasaki, Akashi; Ando, Hiroyuki; and Hamashima, Eiji, 4,995,559, Cl. 239-493.000.

Nakanishi, Toshihide: *See*—
Furukawa, Satoru; and Nakanishi, Toshihide, 4,996,147, Cl. 435-115.000.
Nakano, Kazuo: *See*—
Mitsui, Yasuhiro; Hasumi, Keiji; Watase, Shinichiro; Kuriyama, Katsumi; and Nakano, Kazuo, 4,996,422, Cl. 250-281.000.
Nakano, Takaharu: *See*—
Saho, Takahiro; Akutsu, Yoshinori; Nakano, Takaharu; and Ohtake, Nobumasa, 4,996,280, Cl. 528-15.000.
Nakano Vinegar Co., Ltd.: *See*—
Akano, Hirofumi; Sato, Takeshi; Okumura, Hajime; Kawamura, Yoshiya; and Shimada, Kyo, 4,996,064, Cl. 426-46.000.
Nakashima, Hiroshi: *See*—
Terazawa, Tadashi; Nakashima, Hiroshi; and Taguchi, Yoshinori, 4,995,363, Cl. 123-399.000.
Nakata, Jyoji: *See*—
Kitamura, Masashi; Kobayashi, Takashi; Kakiuchi, Shunji; Yamaguchi, Kiyoshi; Tomeoku, Hiroshi; Maki, Naoki; Nakata, Jyoji; and Uno, Yasumichi, 4,996,496, Cl. 328-228.000.
Nakatsuji, Tadao: *See*—
Yoshimoto, Masafumi; Nakatsuji, Tadao; and Sato, Noriaki, 4,996,015, Cl. 264-177.110.
Nakaya Jitsugyo Co., Ltd.: *See*—
Yukimi, Oogawara, 4,995,561, Cl. 241-62.000.
Nakaya, Toshiharu; Nagahata, Satoru; Konishi, Sakuichi; and Kuwano, Koichi, to Nippon Paint Co., Ltd. Film forming method. 4,996,076, Cl. 427-38.000.
Nakayama, Noritaka: *See*—
Masukawa, Toyoaki; Uchida, Takashi; and Nakayama, Noritaka, 4,996,139, Cl. 430-558.000.
Nakayama, Shinichi: *See*—
Kobayashi, Kinzo; Nakayama, Shinichi; and Suzuki, Shigeo, 4,995,482, Cl. 188-73.100.
Nakayama, Tomoyuki; Hoshino, Hiroyuki; Ohtani, Hirofumi; and Matsuzaka, Syoji, to Koaica Corporation. Silver halide photographic material. 4,996,140, Cl. 430-569.000.
Nakayama, Yoshiro, to Mitsubishi Denki Kabushiki Kaisha. Core retaining apparatus for wire-cut electro-discharge machine. 4,996,406, Cl. 219-69.120.
Nakazawa, Toshihiko: *See*—
Motoi, Toshihiro; Nakazawa, Toshihiko; Takesue, Toshihiro; Takahashi, Satoshi; and Murahashi, Takashi, 4,996,540, Cl. 346-108.000.
Naku, Virgil, to Precision Valve Corporation. One-piece tire valve adaptor. 4,995,417, Cl. 137-231.000.
Nalco Chemical Company: *See*—
Goss, Michael; and Mincy, John E., 4,995,912, Cl. 134-2.000.
Namba, Hideaki: *See*—
Kamei, Eiichi; Namba, Hideaki; Ohba, Masahiro; Tanaka, Shinichiro; and Aoki, Keiji, 4,995,364, Cl. 123-442.000.
Namiki, Takemasa: *See*—
Tobisawa, Seiichi; Namiki, Takemasa; and Kawabe, Shigetoshi, 4,995,339, Cl. 118-410.000.
Nanri, Seiji; Ueno, Masatoshi; and Ohno, Takashi, to Dainippon Screen Mfg. Co., Ltd. Apparatus for exposing an image of an original film on a photosensitive material in vacuum contact with the original film, and method therefor. 4,996,560, Cl. 355-91.000.
Napoli, Louis S.: *See*—
Ipri, Alfred C.; and Napoli, Louis S., 4,996,575, Cl. 357-23.700.
Nasser, AlexSandra C.: *See*—
Ross, Stanley E.; and Nasser, AlexSandra C., 4,995,884, Cl. 8-115.600.
Nasu, Nobuo, to Kabushiki Kaisha Kawakami Seisakusho. Apparatus for cutting laminated sheet material. 4,995,287, Cl. 83-169.000.
Nasu, Rikuo; Komyoji, Terumasa; Nakajima, Toshio; Suzuki, Kazumi; Ito, Keiichiro; Oshima, Takeshi; and Yoshimura, Hideshi, to Ishihara Sangyo Kaisha, Ltd. Imidazole compounds and biocidal composition comprising the same for controlling harmful organisms. 4,995,898, Cl. 71-90.000.
National Gypsum Company: *See*—
Menchetti, Robert J., 4,995,215, Cl. 52-747.000.
National Research Council of Canada: *See*—
Cielo, Paolo G.; Maldague, Xavier; and Krapez, Jean C., 4,996,426, Cl. 250-330.000.
National Research Development Corporation: *See*—
Baldwin, Jack E., 4,996,313, Cl. 540-312.000.
Laurence, Roger F., deceased; and Morgan, Leon R., executor, 4,996,712, Cl. 381-68.400.
National Semiconductor Corp.: *See*—
Say, Quincy, 4,996,626, Cl. 361-91.000.
Yee, Loren; and Sinh, Nguyen X., 4,996,452, Cl. 307-475.000.
National Slag Limited: *See*—
Spencer, Kenneth W.; Horvat, David T.; and MacKenzie, Peter A., 4,995,894, Cl. 65-19.000.
National Starch and Chemical Investment Holding Corporation: *See*—
Leighton, John; and Iovine, Carmine, 4,996,045, Cl. 424-70.000.
Schoenberg, Jules E., 4,996,268, Cl. 525-434.000.
Nativelle S.A.: *See*—
Jarreau, Francois X.; Azerad, Robert G.; and Ogerau, Thierry P., 4,996,149, Cl. 435-119.000.
Nave, Mark J. Measuring and limiting EMI with a selectable mode reflection network. 4,996,488, Cl. 324-613.000.
Naveau, Paul; and Wilmotte, Stephan, to Centre De Recherches Metallurgigues. Device for cooling a metal during castings. 4,995,446, Cl. 164-437.000.
Naya, Masaru; Kuzumaki, Masayuki; and Ishikawa, Susumu, to Kabushiki Kaisha Toshiba; Koyusha Co.; and Kanazawa Industry Co. Ltd. Device for making liquid coffee. 4,995,311, Cl. 99-295.000.
NCR Corporation: *See*—
Ebato, Ken; and Sato, Susumu, 4,995,184, Cl. 40-531.000.
Harvey, Robert T.; and White, David C., 4,996,628, Cl. 361-393.000.
NEC Corporation: *See*—
Ishimoto, Satomi; Matsushima, Osamu; and Sakuma, Hajime, 4,996,639, Cl. 364-200.000.
Nakada, Kazuhiro, 4,996,446, Cl. 307-296.200.
Noguchi, Kesao, 4,995,703, Cl. 350-333.000.
NEC Home Electronics Ltd.: *See*—
Demura, Toshiaki; and Tonoki, Ikuo, 4,995,143, Cl. 16-357.000.
Negaty-Hindi, Guy: *See*—
Jolly, Mark; Negaty-Hindi, Guy; and Haour, Georges, 4,995,444, Cl. 164-97.000.
Negishi, Kenji; Sasaki, Hidemi; and Fujishiro, Takeshi, to Fuji Photo Film Co., Ltd. Apparatus for adjustably supporting a head carriage. 4,996,619, Cl. 360-109.000.
Neher, Ralph A.: *See*—
Torres, Daniel L.; Gullikson, Darryl C.; Case, M. Bruce; and Neher, Ralph A., 4,995,413, Cl. 137-1.000.
Nelson, Blaine J., to Rockwell International Corporation. Clock signal resynchronizing apparatus. 4,996,698, Cl. 375-118.000.
Nelson, Gregory H.; Lebow, Sanford; and Nogavich, Eugene, to Rogers Corporation. Method of manufacture interconnect device. 4,995,941, Cl. 156-630.000.
Nelson, Jay B.: *See*—
Boehringer, John R.; Nelson, Jay B.; and Karpowicz, John, 4,995,400, Cl. 128-725.000.
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, to General Electric Company. Enhancing color stability to sterilizing radiation of polymer compositions. 4,996,245, Cl. 523-136.000.
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, to General Electric Company. Enhancing color stability to sterilizing radiation of polymer compositions. 4,996,246, Cl. 523-136.000.
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, to General Electric Company. Enhancing color stability to sterilizing radiation of polymer compositions. 4,996,247, Cl. 523-136.000.
Nelson, Linda H.; Avakian, Roger W.; and Factor, Arnold, to General Electic Company. Enhancing color stability to sterilizing radiation of polymer compositions. 4,996,248, Cl. 523-136.000.
Nemes, Richard M., to Bell Communications Research, Inc. Methods and apparatus for decontaminating hash tables. 4,996,663, Cl. 364-900.000.
Nemet-Mavrodin, Margaret: *See*—
Pickering, John L., Jr.; and Nemet-Mavrodin, Margaret, 4,996,381, Cl. 585-413.000.
Nemir, David C. Apparatus for treating bruxism. 4,995,404, Cl. 128-777.000.
Neonics, Inc.: *See*—
Hey, John B., 4,996,642, Cl. 364-419.000.
Neste Oy: *See*—
Suvanto, Erkki, 4,996,014, Cl. 264-113.000.
Nestor, Charles R.: *See*—
Borden, Thomas E.; Nestor, Charles R.; and Solano, David W., 4,995,822, Cl. 439-161.000.
Neubauer, Hans-Juergen: *See*—
Leyendecker, Joachim; Neubauer, Hans-Juergen; Kardorff, Uwe; Kuenast, Christoph; Hofmeister, Peter; and Krieg, Wolfgang, 4,996,216, Cl. 514-338.000.
Neuenschwander, Kent W.: *See*—
Regan, John R.; and Neuenschwander, Kent W., 4,996,234, Cl. 514-563.000.
Neugebauer, Constantine A.: *See*—
Webster, Harold F.; Neugebauer, Constantine A.; and Burgess, James F., 4,996,116, Cl. 428-627.000.
Neumann, Peter; and Eichenauer, Ulrich, to BASF Aktiengesellschaft. Preparation of 2,4-dihydroxybenzoic acid. 4,996,354, Cl. 562-424.000.
Neuromag OY: *See*—
Ilmoniemi, Risto; and Ahlfors, Seppo, 4,995,395, Cl. 128-653.00R.
Neutrogena Corporation: *See*—
Matravers, Peter, 4,996,238, Cl. 514-865.000.
Matravers, Peter, 4,996,239, Cl. 514-873.000.
New England Biolabs, Inc.: *See*—
Brooks, Joan E.; and Szryter, Laura A., 4,996,151, Cl. 435-172.300.
New England Deaconess Hospital Corporation: *See*—
Salem, Ronald R.; Thomas, Peter; and Steele, Glenn, 4,996,298, Cl. 530-395.000.
New Japan Chemical Co., Ltd.: *See*—
Tsuyoshi, Ikeda, 4,996,293, Cl. 528-352.000.
Newell, Robert D. Mop head comprising capacitive web elements, and method of making the same. 4,995,133, Cl. 15-229.001.
Newkirk, Marc S.; Lesher, H. Daniel; Dwivedi, Ratnesh K.; and Kantner, Robert C., to Lanxide Technology Company, LP. Reservoir feed method of making ceramic composite structures and structures made thereby. 4,996,176, Cl. 501-127.000.
Newman, Thomas C.: *See*—
Mehaffey, Joseph L.; and Newman, Thomas C., 4,995,965, Cl. 209-166.000.
Newton, Thomas A., Jr.: *See*—
Barr, John D.; and Newton, Thomas A., Jr., 4,995,887, Cl. 51-295.000.
Ng, Raymond C. Neonstal mucus extractor. 4,995,386, Cl. 128-205.190.

NHK Spring Co. Ltd.: *See*—
Kitamura, Yoshiharu, 4,995,579, Cl. 248-284.000.
Nakamura, Kouji; and Akeda, Mamoru, 4,995,485, Cl. 188-322.170.
Ojima, Juji, 4,995,854, Cl. 474-111.000.
Nibrig, Reinhold: *See*—
Eberhardt, Kurt; and Nibrig, Reinhold, 4,995,729, Cl. 366-2.000.
Nicholas, Beatrice M.; Mosley, Alan; Hilsum, Cyril; and Clark, Michael G., to General Electric Company, p.l.c., The. Temperature-sensitive materials and devices. 4,996,104, Cl. 428-323.000.
Nichols, Colin J.; Nordgren, Gregory N.; and Moorehead, Harvey R., to Catheter Technology Corporation. Catheter with slit valve. 4,995,863, Cl. 604-247.000.
Nichols, Dwight E., to Hoover Group, Inc. Dry-break discharge valve assembly for a liquid bulk container. 4,995,588, Cl. 251-144.000.
Nick, Klaus-Peter: *See*—
Carlhoff, Christoph; Lorenzen, Claus-Jurgen; and Nick, Klaus-Peter, 4,995,723, Cl. 356-318.000.
Nieberle, Juergen: *See*—
Czauderna, Bernhard; Nieberle, Juergen; Peter, Roland; and Nissen, Dietmar, 4,996,270, Cl. 525-531.000.
Niemann, Gary O. Method and apparatus for weighing and dispensing objects. 4,995,467, Cl. 177-25.180.
Niese, Michael; and Stoehr, James H., to Robbins, Inc. Free floating floor system and method for forming. 4,995,210, Cl. 52-391.000.
Nihei, Hiroaki: *See*—
Tate, Takao; Nakamura, Norihiko; Noguchi, Hiroshi; Kawagoe, Michio; Baika, Toyokazu; Kato, Kichiro; Kido, Yoshio; Hirose, Katsuhiko; Nihei, Hiroaki; and Masubuchi, Masahiko, 4,995,347, Cl. 123-65.0BA.
Nihon Medi-Physics Co., Ltd.: *See*—
Sakata, Isao; Nakajima, Susumu; Koshimizu, Koichi; Samejima, Natsuki; Inohara, Kazumi; Takata, Hiroyuki; Yamauchi, Hirohiko; Ueda, Nobuo; and Hazue, Masaaki, 4,996,312, Cl. 540-145.000.
Nihon Plast Co., Ltd.: *See*—
Kobayashi, Sadao; Tomono, Hidemi; and Yoshida, Kazunobu, 4,995,286, Cl. 82-101.000.
Niiranen, Tapani: *See*—
Ljokkoi, Risto; Niiranen, Tapani; Purho, Pekka; Savolainen, Erkki; and Siitonen, Jari, 4,995,991, Cl. 210-797.000.
Nikon Corporation: *See*—
Matsui, Hideki; Hagiuda, Nobuyoshi; Yokonuma, Norikazu; Sakamoto, Hiroshi; and Iida, Yoshikazu, 4,996,550, Cl. 354-420.000.
Nippon Carbide Kogyo Kabushiki Kaisha: *See*—
Hasegawa, Yukinobu; Shimomura, Hiroyoshi; Murai, Koichi; Maruyama, Masatoshi; and Tange, Toyokichi, 4,996,127, Cl. 430-109.000.
Nippon Densan Corporation: *See*—
Hishida, Noriaki, 4,996,613, Cl. 360-99.080.
Nippon Filcon Co., Ltd.: *See*—
Tate, Takuo; Watanabe, Taketoshi; and Nagura, Hiroyuki, 4,995,428, Cl. 139-383.00A.
Nippon Hoso Kyokai: *See*—
Nishida, Yasuaki; Iino, Yoshiki; Ohtake, Hiroshi; Abe, Masahide; Yoshikawa, Shigeo; Endo, Yukio; Matsunaga, Yoshiyuki; and Harada, Nozomu, 4,996,600, Cl. 358-213.220.
Nippon Oil Co., Ltd.: *See*—
Sano, Akira; Kamiishi, Hirofumi; and Matsuura, Kazuo, 4,996,011, Cl. 264-28.000.
Nippon Paint Co., Ltd.: *See*—
Nakaya, Toshiharu; Nagahata, Satoru; Konishi, Sakuichi; and Kuwano, Koichi, 4,996,076, Cl. 427-38.000.
Nippon Pillar Packing Co., Ltd.: *See*—
Fuse, Toshihiko, 4,995,622, Cl. 277-80.000.
Nippon Piston Ring Co., Ltd.: *See*—
Shindo, Norikazu; Sekine, Tomoyuki; Nakamura, Yoshikatsu; and Kawamoto, Takashi, 4,996,022, Cl. 419-2.000.
Nippon Seiko Kabushiki Kaisha: *See*—
Saito, Hiroyuki, 4,995,640, Cl. 280-804.000.
Tada, Tatsuo, 4,996,395, Cl. 200-61.58B.
Nippon Sheet Glass Co., Ltd.: *See*—
Takatsuki, Nobuyuki; and Shukuri, Kyoichi, 4,996,622, Cl. 360-135.000.
Nippon Telegraph and Telephone Corp.: *See*—
Kitamura, Masashi; Kobayashi, Takashi; Kakiuchi, Shunji; Yamaguchi, Kiyoshi; Tomeoku, Hiroshi; Maki, Naoki; Nakata, Jyoji; and Uno, Yasumichi, 4,996,496, Cl. 328-228.000.
Nippon Zeon Co., Ltd.: *See*—
Aonuma, Mitsuyoshi; Suzuki, Tatsunosuke; Isomura, Satoru; and Nishimura, Koichi, 4,996,264, Cl. 525-179.000.
Nippondenso Co., Ltd.: *See*—
Kamei, Eiichi; Namba, Hideaki; Ohba, Masahiro; Tanaka, Shinichiro; and Aoki, Keiji, 4,995,364, Cl. 123-442.000.
Nakamura, Masayuki; Katayama, Kazuyuki; and Furuhashi, Yasuhiro, 4,995,368, Cl. 123-501.000.
Nis Pri Vissh Chimikotechnologiches Ki Institut: *See*—
Lingorski, Nikola A.; Hadjiiski, Mincho B.; Yovchev, Rumen B.; Spassov, Kamen B.; and Savov, Peter H., 4,995,732, Cl. 374-139.000.
Nishida, Masahiro: *See*—
Toyama, Tadao; Kunichika, Kenji; Hishiki, Norio; and Nishida, Masahiro, 4,996,135, Cl. 430-309.000.
Nishida, Yasuaki; Iino, Yoshiki; Ohtake, Hiroshi; Abe, Masahide; Yoshikawa, Shigeo; Endo, Yukio; Matsunaga, Yoshiyuki; and Harada, Nozomu, to Nippon Hoso Kyokai; and Kabushiki Kaisha Toshiba. Two dimensional solid state image sensing device. 4,996,600, Cl. 358-213.220.
Nishigami, Takashi; and Kado, Michio, to Mazda Motor Corporation. Door lock appartaus for automotive vehicle. 4,995,654, Cl. 292-216.000.
Nishihara, Takashi: *See*—
Shiraishi, Shuji; Nishihara, Takashi; Kiryu, Hironobu; and Omomo, Naoki, 4,996,657, Cl. 364-559.000.
Nishijima, Takashi: *See*—
Ogawa, Izumi; Kurihara, Kazuyoshi; Uchida, Seigo; and Nishijima, Takashi, 4,996,604, Cl. 358-474.000.
Nishikawa, Hiromitsu: *See*—
Yamagishi, Jun; Nishikawa, Hiromitsu; and Takeda, Akihiro, 4,995,568, Cl. 242-125.100.
Nishimoto, Toshiaki: *See*—
Kume, Hitoshi; Kamigaki, Yoshiaki; Adachi, Tetsuo; Tsukada, Toshihisa; Komori, Kazuhiro; Nishimoto, Toshiaki; Muto, Tadashi; and Koizumi, Toshiko, 4,996,571, Cl. 357-23.500.
Nishimura, Eiichi; and Tamura, Yasuaki, to Oki Electric Industry Co., Ltd. Optical amplifier module. 4,995,696, Cl. 350-96.200.
Nishimura, Koichi: *See*—
Aonuma, Mitsuyoshi; Suzuki, Tatsunosuke; Isomura, Satoru; and Nishimura, Koichi, 4,996,264, Cl. 525-179.000.
Nishimura, Michihiko: *See*—
Yoshida, Kinoto; Fujii, Morizumi; Tsuda, Tokihiro; Suda, Shigeo; Kodama, Osamu; Kuroe, Kazuro; Tanikawa, Takumi; Nishimura, Michihiko; and Munakata, Hideyuki, 4,995,932, Cl. 156-242.000.
Nishimura, Yasuhiro; Suzuki, Motoko; and Fukuda, Yozo, to Hamair Chemicals, Ltd. Use of Zn-protoporphyrin for hepatitis treatment. 4,996,200, Cl. 514-185.000.
Nishio, Hiroaki; and Kato, Akira, to NKK Corporation. Method for casting powder. 4,996,024, Cl. 419-40.000.
Nishio, Kouji: *See*—
Katsuragi, Kenjiro; and Nishio, Kouji, 4,995,393, Cl. 128-648.000.
Nishiyama, Hisashi; Katakura, Kageyoshi; and Ogawa, Toshio, to Hitachi, Ltd. Pulse doppler flow speed meter. 4,995,397, Cl. 128-661.090.
Nishizuka, Sakae: *See*—
Tokuhiro, Tomoya; Koibuchi, Nobutaka; Miyauchi, Teruhiko; Kikuchi, Koshin; Hirokawa, Jun; Yamashiro, Kunio; Nishizuka, Sakae; Watanabe, Ippei; Maruo, Shozo; Tsutsui, Yohichiro; and Ishikawa, Sadahito, 4,995,765, Cl. 406-117.000.
Nissan Motor Company, Ltd.: *See*—
Ichinose, Hisao; Takeda, Yoshimitsu; Sato, Tsuyoshi; and Imai, Hiroshi, 4,995,665, Cl. 296-213.000.
Yokoyama, Junichi; Urushihara, Tomonori; Itoh, Teruyuki; and Fujii, Hiroyuki, 4,995,359, Cl. 123-188.00M.
Nissen, Dietmar: *See*—
Czauderna, Bernhard; Nieberle, Juergen; Peter, Roland; and Nissen, Dietmar, 4,996,270, Cl. 525-531.000.
Nitro Nobel AB: *See*—
Engsbraten, Bjorn, 4,995,925, Cl. 149-2.000.
NKK Corporation: *See*—
Iwasaki, Katsuhiro; Takahashi, Kenji; Inoue, Shigeru; Tanabe, Haruyoshi; Kawakami, Masahiro; and Terada, Osamu, 4,995,906, Cl. 75-502.000.
Nishio, Hiroaki; and Kato, Akira, 4,996,024, Cl. 419-40.000.
Okado, Akiyoshi; Abe, Masaki; Kagechika, Hiroshi; and Kagaya, Shinichi, 4,996,118, Cl. 428-639.000.
Sato, Tomoaki; and Kondo, Munetake, 4,995,320, Cl. 104-118.000.
Noble, David: *See*—
Sutherland, Derek R.; Ramsay, Michael V. J.; Ward, John B.; Porter, Neil; Noble, Hazel M.; Fletton, Richard A.; and Noble, David, 4,996,228, Cl. 514-450.000.
Noble, Hazel M.: *See*—
Sutherland, Derek R.; Ramsay, Michael V. J.; Ward, John B.; Porter, Neil; Noble, Hazel M.; Fletton, Richard A.; and Noble, David, 4,996,228, Cl. 514-450.000.
Noble, Milton L.; and Milton, Albert F., to General Electric Company. Imager for simultaneously obtaining two images of differing color bands using a single photodetector area array. 4,996,427, Cl. 250-332.000.
Noda, Masahiro; Fuchigami, Masaharu; and Akagawa, Akira, to Yushiro Chemical Industry Co., Ltd. Antibacterial water-soluble cutting fluid resistant to yeast-like fungi. 4,995,997, Cl. 252-49.500.
Noda, Shigekazu, to Kabushiki Kaisha Komatsu Seisakusho. Method of changing dies for a press machine. 4,995,255, Cl. 72-446.000.
Nogavich, Eugene: *See*—
Nelson, Gregory H.; Lebow, Sanford; and Nogavich, Eugene, 4,995,941, Cl. 156-630.000.
Noguchi, Akihiko: *See*—
Fujiwara, Michio; Matsumaru, Hiroshi; Kobayashi, Yasushi; Sakai, Yoshio; Yoneda, Kenzi; Dohi, Osamu; and Noguchi, Akihiko, 4,995,479, Cl. 187-135.000.
Noguchi, Hiroshi: *See*—
Tate, Takao; Nakamura, Norihiko; Noguchi, Hiroshi; Kawagoe, Michio; Baika, Toyokazu; Kato, Kichiro; Kido, Yoshio; Hirose, Katsuhiko; Nihei, Hiroaki; and Masubuchi, Masahiko, 4,995,347, Cl. 123-65.0BA.
Noguchi, Hiroyuki: *See*—
Kawai, Tatsundo; Ogura, Makoto; Tomoda, Koji; Ichihashi, Hiroo; Seitoh, Shinichi; Kuroda, Yasuo; and Noguchi, Hiroyuki, 4,996,606, Cl. 358-475.000.

Noguchi, Kesao, to NEC Corporation. Active matrix liquid crystal color display panel having split pixel electrodes. 4,995,703, Cl. 350-333.000.

Nohmi Bosai Co., Ltd.: *See—*
Takahashi, Kaoru; Tsumiji, Akio; and Shutoku, Ryuji, 4,996,518, Cl. 340-518.000.

Noirjean, Pierre-Andre , to ETA S.A. Fabriques d'Ebauches. Miniature electric clock. 4,996,676, Cl. 368-73.000.

NOK Corporation: *See—*
Wada, Noriyuki; and Yamanaka, Satoshi, 4,995,623, Cl. 277-208.000.

Nokia Unterhaltungselektronik: *See—*
Gunter, Werthmann, 4,996,429, Cl. 250-336.100.

Nomoto, Kenichi: *See—*
Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, 4,996,215, Cl. 514-316.000.

Nomura, Noboru; Ueno, Atsushi; Hashimoto, Kazuhiko; and Kinoshita, Satoshi, to Matsushita Electric Industrial Co., Ltd. Optically oriented photoresist pattern forming method using organic crystal in photoresist layer with specified refracting indices formula. 4,996,123, Cl. 430-20.000.

Nomura, Takaaki, to Hitachi Ltd. Method and device for editing a document having a plurality of headings. 4,996,665, Cl. 364-900.000.

Nomura, Yoshio, to Casio Computer Co., Ltd. String vibration detecting device for electronic stringed instrument. 4,995,292, Cl. 84-726.000.

Nordbryhn, Andreas, to Tomra Systems A/S. Device for measuring dimensions. 4,996,440, Cl. 250-561.000.

Nordgren, Gregory N.: *See—*
Nichols, Colin J.; Nordgren, Gregory N.; and Moorehead, Harvey R., 4,995,863, Cl. 604-247.000.

Nordson Corporation: *See—*
Claassen, Henning J., 4,995,558, Cl. 239-226.000.

Noren, Gerry K.; Krajewski, John J.; and Murphy, Edward J., to DeSoto, Inc. Cationically curable polyurethane compositions having vinyl ether functionality. 4,996,282, Cl. 528-75.000.

Norlien, John A.; Huhn, James M.; and Crawford, A. Gerrit, to Medical Graphics Corporation. Zirconia cell O_2 sensor for respiratory gas analysis. 4,995,256, Cl. 73-31.040.

Norman, Richard O., to TexPro, Inc. Detachable volved dispensing head for bottle. 4,995,534, Cl. 222-511.000.

North American Products, Corp.: *See—*
Segal, Arthur R., 4,995,767, Cl. 407-41.000.

Northeastern University: *See—*
Karger, Barry L.; Feibush, Binyamin; Miller, Neil T.; and Figueroa, Alvaro, 4,996,343, Cl. 556-445.000.

Northern Telecom Limited: *See—*
Morley, Robert S.; Smith, Roland A.; and Sayre, Paul D., 4,996,684, Cl. 370-100.100.
Orr, Raymond K., 4,996,638, Cl. 363-21.000.
Thomas, Robert M.; and Pigeon, Joseph P. R. M., 4,996,444, Cl. 307-269.000.
Wilcox, Philip S.; Nadeau-Dostie, Benoit; and Agarwal, Vinod K., 4,996,691, Cl. 371-68.100.

Norton, Ted R.: *See—*
Moore, Richard E.; Furusawa, Eiichi; Norton, Ted R.; Patterson, Gregory M. L.; and Mynderse, Jon S., 4,996,229, Cl. 514-450.000.

Noth, Richard W.: *See—*
Hinrichsmeyer, Kurt; Straehle, Werner; Kelley, Gordon A., Jr.; and Noth, Richard W., 4,996,587, Cl. 357-74.000.

Nouel, Jean-Marie. Offset plate with thin chromium layer and method of making. 4,996,131, Cl. 430-276.000.

Nounou, Fadia: *See—*
Davis, James L.; Pennisi, Robert W.; Nounou, Fadia; and Landreth, Bobby D., 4,995,921, Cl. 148-22.000.

Nova Manufacturing, Inc.: *See—*
Aldecoa, Julio A.; and Miller, Lawrence F., 4,996,128, Cl. 429-153.000.

Nowak, Florian I. Mechanism for preventing inadvertent chuck release. 4,995,625, Cl. 279-1.00C.

NSK-Warner Kabushiki Kaisha: *See—*
Kanai, Kenichi, 4,995,490, Cl. 192-45.000.

NSM Apparatebau GmbH & Co. KG: *See—*
Menke, Wilhlem, 4,995,498, Cl. 194-205.000.

Numatics, Incorporated: *See—*
Bonacorsi, Dennis L.; McGeachy, Donald E.; and Smith, Alan L., 4,995,421, Cl. 137-383.000.

Nusbaum, Howard G., to Robert R. Gerzel. Side-loading fork lift vehicle. 4,995,774, Cl. 414-544.000.

N.V. Bekaert S.A.: *See—*
Vandorpe, John, 4,996,491, Cl. 324-644.000.

Nystrom, Norman L.: *See—*
Zias, Arthur R.; Block, Barry; Mapes, Kenneth W.; Nystrom, Norman L.; and Cadwell, Robert M., 4,996,627, Cl. 361-283.000.

Obrejanu, Marcel: *See—*
Sask, David; Obrejanu, Marcel; and Grimshaw, Allen, 4,995,462, Cl. 166-304.000.

O'Brien, Michael J.; Spence, Jean E.; Skiff, Ronald H.; Vogel, Gerald J.; and Prasad, Ravi, to Kraft General Foods, Inc. Caffeine recovery from supercritical carbon dioxide. 4,996,317, Cl. 544-274.000.

Occelli, Mario L., to Union Oil Company of California. Crystalline galliosilicate with the zeolite L type structure and its use in chemical catalytic conversions. 4,995,963, Cl. 208-111.000.

Occidental Chemical Corporation: *See—*
Lee, Chung J., 4,996,278, Cl. 528-26.000.

Occidental Research Corporation: *See—*
Schramm, Charles M.; Lane, Robert H.; and Dines, Martin B., deceased, 4,995,897, Cl. 71-64.110.

Ochiai, Fumio: *See—*
Takahashi, Toshio; Matsuno, Kazumasa; Morimoto, Masaru; and Ochiai, Fumio, 4,995,852, Cl. 474-91.000.

O'Connell, Daniel, to Morton International, Inc. Compositions of non-film forming polysulfide, latex emulsion and hydrocarbon resin. 4,996,260, Cl. 524-381.000.

O'Connor, John F., to Torrington Research Company. Axial flow impeller. 4,995,787, Cl. 416-228.000.

Oda, Junichi; Amano, Masaki; Toda, Haruhiko; and Koyagi, Toshiyuki. Optical resolution of racemic alcohols. 4,996,158, Cl. 435-280.000.

Odano, Taminori: *See—*
Enomoto, Shigeo; and Odano, Taminori, 4,996,545, Cl. 354-70.000.

Ofner, Maximilian, to IBV, Firma. Sifter-screening machine for bulk material. 4,995,966, Cl. 209-240.000.

Ogata, Naoya, to Goodyear Tire & Rubber Co., The. Low temperature synthesis of condensation polymers. 4,996,178, Cl. 502-159.000.

Ogawa, Izumi; Kurihara, Kazuyoshi; Uchida, Seigo; and Nishijima, Takashi, to Tokyo Electric Co., Ltd. Image scanner. 4,996,604, Cl. 358-474.000.

Ogawa, Kazufumi; Tamura, Hideharu; and Mino, Norihisa, to Matsushita Electric Industrial Co., Ltd. Method for producing ultrathin metal film and ultrathin-thin metal pattern. 4,996,075, Cl. 427-12.000.

Ogawa, Toshio: *See—*
Nishiyama, Hisashi; Katakura, Kageyoshi; and Ogawa, Toshio, 4,995,397, Cl. 128-661.090.

Ogerau, Thierry P.: *See—*
Jarreau, Francois X.; Azerad, Robert G.; and Ogerau, Thierry P., 4,996,149, Cl. 435-119.000.

Ogura, Makoto: *See—*
Kawai, Tatsundo; Ogura, Makoto; Tomoda, Koji; Ichihashi, Hiroo; Seitoh, Shinichi; Kuroda, Yasuo; and Noguchi, Hiroyuki, 4,996,606, Cl. 358-475.000.

Ohashi, Masashi; Toyama, Yoshikuni; Kagiura, Kazuo; Maruyama, Hiroyoshi; Shiratori, Tatsuya; Shirai, Masanari; and Ando, Eiichi, to Canon Kabushiki Kaisha. Anti-skew sheet feeding device for image forming apparatus and sheet storage device for use therein. 4,995,601, Cl. 271-127.000.

Ohashi, Yoshimasa: *See—*
Kirimoto, Tetsuo; Fujisaka, Takahiko; and Ohashi, Yoshimasa, 4,996,532, Cl. 342-81.000.

Ohba, Masahiro: *See—*
Kamei, Eiichi; Namba, Hideaki; Ohba, Masahiro; Tanaka, Shinichiro; and Aoki, Keiji, 4,995,364, Cl. 123-442.000.

Ohgoda, Makoto; and Tamura, Kaoru, to Fuji Photo Film Co., Ltd. Apparatus for scanning sheet-shaped recording medium between edge rollers. 4,996,542, Cl. 346-108.000.

Ohi Seisakusho Co., Ltd.: *See—*
Yamagishi, Jun; Nishikawa, Hiromitsu; and Takeda, Akihiro, 4,995,568, Cl. 242-125.100.

Ohkawa, Kazuhiro; and Yamazaki, Taro, to Toshiba Silicone Co., Ltd. Pressure-sensitive resistance element. 4,996,511, Cl. 338-114.000.

Ohkubo, Satoru; and Demizu, Akira, to Mitsubishi Denki Kabushiki Kaisha. Valve timing control apparatus for an internal combustion engine. 4,995,351, Cl. 123-90.110.

Ohl, William C., to AMP Incorporated. Set of strips of electrical terminals and a method of loading an electrical connector with said terminals. 4,995,819, Cl. 439-79.000.

Ohmura, Keiji; Okuno, Sumio; Takeichi, Michifumi; Okazaki, Masato; and Tsuruda, Hitoshi, to Hitachi, Ltd. Car body for railway rolling stock. 4,995,321, Cl. 105-397.000.

Ohnishi, Tetsuya: *See—*
Kadowaki, Toshihiro; Ohnishi, Tetsuya; Katoh, Koichi; Suzuki, Yasumichi; and Honma, Toshio, 4,996,591, Cl. 358-80.000.

Ohnishi, Toshikazu: *See—*
Yoshinaga, Kazuo; Miyazaki, Takeshi; Ohnishi, Toshikazu; Kurabayashi, Yutaka; Takasu, Yoshio; and Kobayashi, Tadashi, 4,995,705, Cl. 350-350.00S.

Ohno, Takashi: *See—*
Nanri, Seiji; Ueno, Masatoshi; and Ohno, Takashi, 4,996,560, Cl. 355-91.000.

Ohsakai, Hiroshi, to Jidosha Kiki Co., Ltd. Steering force control apparatus for power steering system. 4,995,970, Cl. 210-167.000.

Ohshima, Toshio, to Fujitsu Limited. Process for fabricating a heterojunction bipolar transistor. 4,996,166, Cl. 437-31.000.

Ohshima, Yutaka: *See—*
Inaba, Makoto; Hayashi, Masaaki; Hashiguchi, Toshihiko; Hibino, Hiroki; Sasa, Hiroyuki; Barlow, David E.; Ohshima, Yutaka; Ishihara, Kohichiro; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Klosterman, Frank; and Goodman, Jack, 4,995,396, Cl. 128-654.000.

Ohsugi, Hiroshi: *See—*
Ishino, Takashi; Hiyama, Isao; Nagano, Yousuke; Shikamori, Tamotu; Turuta, Shizuo; Kamano, Toshiyasu; and Ohsugi, Hiroshi, 4,995,247, Cl. 68-12.00R.

Ohta, Atushi: *See—*
Takahashi, Hiroshi; Ohta, Atushi; and Akasaki, Sayumi, 4,996,356, Cl. 562-587.000.

Ohtake, Hiroshi: *See—*
Nishida, Yasuaki; Iino, Yoshiki; Ohtake, Hiroshi; Abe, Masahide; Yoshikawa, Shigeo; Endo, Yukio; Matsunaga, Yoshiyuki; and Harada, Nozomu, 4,996,600, Cl. 358-213.220.

Ohtake, Nobumasa: *See*—
Saho, Takahiro; Akutsu, Yoshinori; Nakano, Takaharu; and Ohtake, Nobumasa. 4,996,280, Cl. 528-15.000.

Ohtani, Hirofumi: *See*—
Nakayama, Tomoyuki; Hoshino, Hiroyuki; Ohtani, Hirofumi; and Matsuzaka, Syoji. 4,996,140, Cl. 430-569.000.

Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, to Eisai Co., Ltd. Piperidine derivative and pharmaceutical composition containing the same. 4,996,215, Cl. 514-316.000.

Oishi, Minoru: *See*—
Yamada, Shiro; Hirata, Keiichi; Oishi, Minoru; Morimoto, Yoshinari; Furukawa, Akihiro; and Kawasumi, Atsuko. 4,996,640, Cl. 364-200.000.

Ojima, Juji, to NHK Spring Co., Ltd. Tensioner for a chain, belt or the like. 4,995,854, Cl. 474-111.000.

Okada, Hiroyoshi: *See*—
Kobayashi, Takaaki; Tosa, Takahumi; Sato, Hiroyuki; Okada, Hiroyoshi; Miyake, Masao; and Mori, Kenji. 4,996,067, Cl. 426-96.000.

Okada, Kazuo: *See*—
Soga, Kunio; Okada, Kazuo; Tanaka, Noriaki; Sogame, Morio; and Tsujino, Toshio. 4,995,193, Cl. 48-197.00R.

Okada, Senri: *See*—
Hashida, Hideo; Kanno, Hideki; Okada, Senri; Nakamura, Kokichi; and Sumimoto, Haruyoshi. 4,996,402, Cl. 219-10.410.

Okado, Akiyoshi; Abe, Masaki; Kagechika, Hiroshi; and Kagaya, Shinichi, to NKK Corporation. Composite metal plated article excellent in mold-releasability. 4,996,118, Cl. 428-639.000.

Okai, Masakazu: *See*—
Kumagai, Seiichiro; Kono, Michikata; Okai, Masakazu; and Inaga, Hisashi. 4,995,350, Cl. 123-65.0VC.

Okamoto, Kyoichi; and Takami, Kazuo, to Mitsubishi Denki Kabushiki Kaisha. Device for supporting pinion shaft of electric motor for starting engine. 4,995,275, Cl. 74-7.00A.

Okamoto, Toshikazu; and Inoue, Fukashi, to Sanyo Electric Co., Ltd. Circuitry for preventing doming phenomenon in a television receiver and a preventing method thereof. 4,996,590, Cl. 358-74.000.

Okamoto, Yoshio; Nakamura, Yozo; Uchiyama, Kyoichi; Watanabe, Haruo; Kosuge, Tokuo; Onishi, Akira; Terasaki, Akashi; Ando, Hiroyuki; and Hamashima, Eiji, to Hitachi, Ltd.; and Hitachi Automotive Engineering Co., Ltd. Electromagnetic fuel injection valve. 4,995,559, Cl. 239-493.000.

Okamura, Yasushi; Sosogi, Toshiro; and Takaki, Kosuke, to Matsushita Electric Industrial Co., Ltd. Electrically controlled machine tools with tool changing means. 4,995,161, Cl. 29-568.000.

Okazaki, Kouji: *See*—
Inagaki, Takashi; Yoshimoto, Tokuji; Okubo, Michio; Okazaki, Kouji; and Ikeda, Tsugio. 4,995,448, Cl. 165-44.000.

Okazaki, Kunio; and Ishikawa, Kiyomitsu, to Stanley Electric Co., Ltd. Optical communication apparatus for motor vehicle. 4,996,719, Cl. 455-606.000.

Okazaki, Masato: *See*—
Ohmura, Keiji; Okuno, Sumio; Takeichi, Michifumi; Okazaki, Masato; and Tsuruda, Hitoshi. 4,995,321, Cl. 105-397.000.

Oki Electric Industry Co., Ltd.: *See*—
Nishimura, Eiichi; and Tamura, Yasuaki. 4,995,696, Cl. 350-96.200.
Tanoi, Satoru. 4,996,447, Cl. 307-304.000.
Yoshida, Tetsuo. 4,996,592, Cl. 358-85.000.

Oku, Takashi: *See*—
Takagi, Shigehide; Yano, Hideo; Oku, Takashi; Shigeru, Keijiro; Kuboto, Yoshifumi; and Shishikura, Tsutomu. 4,996,177, Cl. 501-153.000.

Okubo, Masayoshi; and Tsujihiro, Masami, to Mita Industrial Co., Ltd. Process for preparation of monodisperse polymer particles having increased particle size. 4,996,265, Cl. 525-242.000.

Okubo, Michio: *See*—
Inagaki, Takashi; Yoshimoto, Tokuji; Okubo, Michio; Okazaki, Kouji; and Ikeda, Tsugio. 4,995,448, Cl. 165-44.000.

Okuda, Yoshihiro: *See*—
Kotegawa, Katsumi, deceased; Okuda, Yoshihiro; Uera, Masaru; and Miki, Hirofumi. 4,995,566, Cl. 242-77.200.

Okumura, Hajime: *See*—
Akano, Hirofumi; Sato, Takeshi; Okumura, Hajime; Kawamura, Yoshiya; and Shimada, Kyo. 4,996,064, Cl. 426-46.000.

Okuno, Sumio: *See*—
Ohmura, Keiji; Okuno, Sumio; Takeichi, Michifumi; Okazaki, Masato; and Tsuruda, Hitoshi. 4,995,321, Cl. 105-397.000.

Okutsu, Naohiro, to Mitsubishi Denki Kabushiki Kaisha. Magnetic recording apparatus having dust removing surface feature. 4,996,614, Cl. 360-103.000.

Okuzawa, Yasutoshi: *See*—
Miyoshi, Takahito; Kanazawa, Minoru; Sugisaki, Tsutomu; Yamada, Takuzi; and Okuzawa, Yasutoshi. 4,995,199, Cl. 51-326.000.

Olberding, Gordon D.; and Shearer, Mahlon W. Automatic rear window. 4,995,195, Cl. 49-118.000.

Oldani, Battistino: *See*—
Bonomi, Giovanni B.; and Oldani, Battistino. 4,995,148, Cl. 29-26.00A.

Olin Corporation: *See*—
Smith, Richard D.; Knowles, Steve; Cassady, R. J.; Smith, William; and Simon, Mark A., 4,995,231, Cl. 60-203.100.

Olin Hunt Specialty Products Inc.: *See*—
Daraktchiev, Ivan S., 4,996,080, Cl. 427-57.000.

Olken, Michael M.; Lee, Guo-shuh J.; and Garces, Juan M., to Dow Chemical Company, The. Separation of ethyltoluene isomers. 4,996,388, Cl. 585-828.000.

Olsen, David B.: *See*—
Franck, Gerald R.; and Olsen, David B., 4,995,452, Cl. 165-119.000.

Olsen, Gordon E.: *See*—
Effland, Richard C.; Davis, Larry; Kapples, Kevin J.; and Olsen, Gordon E., 4,996,205, Cl. 514-250.000.

Olson, Anita D. Apparatus for cleaning with aqueous solution. 4,995,344, Cl. 119-85.000.

Olsson, Mark S.; Parker, Samuel B.; and Rimer, Douglas G., to Deepsea Power & Light, Inc. Deep submersible light assembly with dry pressure dome. 4,996,635, Cl. 362-267.000.

Olympus Optical Co., Ltd.: *See*—
Hashimoto, Takeshi. 4,995,707, Cl. 350-427.000.
Inaba, Makoto; Hayashi, Masaaki; Hashiguchi, Toshihiko; Hibino, Hiroki; Sasa, Hiroyuki; Barlow, David E.; Ohshima, Yutaka; Ishihara, Kohichiro; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Klosterman, Frank; and Goodman, Jack. 4,995,396, Cl. 128-654.000.
Yunoki, Yutaka. 4,996,610, Cl. 360-61.000.

O'Malley, Michael H.: *See*—
O'Malley, Sara; O'Malley, Michael H.; and Peters, Elisabeth. 4,996,707, Cl. 379-100.000.

O'Malley, Sara; O'Malley, Michael H.; and Peters, Elisabeth, to Berkeley Speech Technologies, Inc. Text-to-speech converter of a facsimile graphic image. 4,996,707, Cl. 379-100.000.

Omomo, Naoki: *See*—
Shiraishi, Shuji; Nishihara, Takashi; Kiryu, Hironobu; and Omomo, Naoki. 4,996,657, Cl. 364-559.000.

Oncotech Incorporated: *See*—
Weisenthal, Larry M., 4,996,145, Cl. 435-7.230.

Ong, Nai-Phuan: *See*—
Wang, Zhao Z.; and Ong, Nai-Phuan. 4,996,186, Cl. 505-1.000.

Onishi, Akira: *See*—
Okamoto, Yoshio; Nakamura, Yozo; Uchiyama, Kyoichi; Watanabe, Haruo; Kosuge, Tokuo; Onishi, Akira; Terasaki, Akashi; Ando, Hiroyuki; and Hamashima, Eiji. 4,995,559, Cl. 239-493.000.

Ono, Fumitaka; and Semasa, Takayoshi, to Mitsubishi Denki Kabushiki Kaisha. Image-processing apparatus. 4,996,602, Cl. 358-457.000.

Onogi, Katsuyuki: *See*—
Takahashi, Yoshio; Sudo, Mitsuo; Arikawa, Takamasa; Nakamura, Kenji; Sato, Izumi; Onogi, Katsuyuki; Iura, Takao; and Ishida, Nobuji. 4,995,505, Cl. 198-468.400.

Ooya, Satoshi; Sugiura, Sadanobu; Kawashima, Teruhisa; and Kawamura, Toshio, to Toshiba Ceramics Co., Ltd. Nozzle device for discharging molten metal. 4,995,535, Cl. 222-607.000.

Orient Chemical Industries, Ltd.: *See*—
Tada, Akihiro; Kiriu, Takashi; and Arakawa, Motoomi. 4,996,339, Cl. 556-181.000.

Ormat Turbines, Ltd.: *See*—
Assaf, Gad. 4,995,242, Cl. 62-271.000.

Orpwood, Roger; and Swain, Ian D., to Hodgkinson & Corby Limited. Standing frame assembly for use with wheelchair. 4,995,628, Cl. 280-304.100.

Orr, Raymond K., to Northern Telecom Limited. Method of feedback regulating a flyback power converter. 4,996,638, Cl. 363-21.000.

Orth, Charles D.: *See*—
Barthel, Richard C.; Malone, Peter J.; Orth, Charles D.; and Jarosch, George W., 4,995,240, Cl. 62-225.000.

Orton, Gregory A., to Ampex Corporation. Electromagnetic transducers having E-shaped cores and shielding therebetween. 4,996,620, Cl. 360-121.000.

Osaka Gas Company, Limited: *See*—
Kyutoku, Hirofumi; Matsuoka, Hiroyuki; and Otani, Yoshihisa, 4,996,102, Cl. 428-285.000.

Oshima, Kenji; and Kito, Yasutami, to Otis Elevator Company. Start compensation device for elevators. 4,995,478, Cl. 187-115.000.

Oshima, Takeshi: *See*—
Nasu, Rikuo; Komyoji, Terumasa; Nakajima, Toshio; Suzuki, Kazumi; Ito, Keiichiro; Oshima, Takeshi; and Yoshimura, Hideshi. 4,995,898, Cl. 71-90.000.

Oshio, Hideki; Mishumi, Sadaharu; Yagii, Kiyoshi; Yoshikawa, Satoshi; and Murata, Katsuyoshi, to Central Glass Company, Limited. Method of preparing 1,1,1,2-tetrafluoroethane from 1,1-dichloro-1,2,2,2-tetrafluoroethane. 4,996,379, Cl. 570-176.000.

Osipow, Lloyd I.; Marra, Dorothea C.; and Spitzer, J. George. Synthetic polymer propellant systems. 4,996,240, Cl. 521-78.000.

Otake, Kan: *See*—
Imai, Kuninori; Shiokawa, Takeji; Kato, Shigeo; Ishikawa, Isao; Ikeda, Toshimichi; and Otake, Kan. 4,995,711, Cl. 350-529.000.

Otani, Masaaki; Hiraishi, Shigetoshi; and Hyodo, Kenji, to Mitsubishi Paper Mills, Limited. Thermosensitive recording materials. 4,996,183, Cl. 503-208.000.

Otani, Yoshihisa: *See*—
Kyutoku, Hirofumi; Matsuoka, Hiroyuki; and Otani, Yoshihisa, 4,996,102, Cl. 428-285.000.

Otis Elevator Company: *See*—
Oshima, Kenji; and Kito, Yasutami. 4,995,478, Cl. 187-115.000.

Otsuru, Hiromi: *See*—
Tanuma, Itsuo; Otsuru, Hiromi; and Honda, Toshio. 4,996,110, Cl. 428-343.000.

Outland, Robert J.: *See*—
Stegeman, George T.; Zarger, Tony H.; and Outland, Robert J., 4,995,353, Cl. 123-90.480.

Ouyang, George B.: *See*—
Shieh, Chiung-Huei; Funt, John M.; and Ouyang, George B., 4,995,197, Cl. 51-281.00R.

Ouziel, Philippe: *See*—
Kuhn, Martin; and Ouziel, Philippe, 4,996,348, Cl. 558-445.000.

Owen, R. Calvin: *See*—
Krupa, Robert J.; and Owen, R. Calvin, 4,995,721, Cl. 356-305.000.

Oxyrase, Inc.: *See*—
Copeland, James C.; Adler, Howard I.; and Crow, Weldon D., 4,996,073, Cl. 426-487.000.

Oyama, Takuji; Suzuki, Koichi; and Mizuhashi, Mamoru, to Asahi Glass Company Ltd. Transparent laminated product. 4,996,105, Cl. 428-336.000.

Ozaki, Hiroji; and Nagao, Shigeo, to Mitsubishi Denki Kabushiki Kaisha. Method for manufacturing P type semiconductor device employing diffusion of boron glass. 4,996,168, Cl. 437-164.000.

Ozawa, Kazuo: *See*—
Urayama, Kiyoshi; and Ozawa, Kazuo, 4,995,565, Cl. 242-71.800.

Pacific Bearing Co.: *See*—
Schroeder, Robert, 4,995,734, Cl. 384-38.000.

Pacific Scientific Company: *See*—
Hancock, Clyde J.; and Hendershot, James R., 4,995,159, Cl. 29-596.000.

Packard, Thomas J., to Minnesota Mining and Manufacturing Company. Stethoscope with diaphragm head adapter. 4,995,473, Cl. 181-137.000.

Pacmac, Inc.: *See*—
Terminella, Frank; Terminella, Manuele; and Stroud, William, 4,995,225, Cl. 53-556.000.

Paduano, Anthony E., Sr. Pre-tied necktie set. 4,995,118, Cl. 2-150.000.

Pagano, Daniel M.; and Cloutier, Robert P., to Eastman Kodak Company. Camera apparatus for magnetically recording on film. 4,996,546, Cl. 354-76.000.

Pahlke, Wulf: *See*—
Tsaklakidis, Christos; Bosies, Elmar; Schultz, Michael; Haag, Rainer; Herrmann, Dieter; and Pahlke, Wulf, 4,996,219, Cl. 514-341.000.

Palensky, Frederick J.: *See*—
Rasmussen, Jerald K.; Heilmann, Steven M.; and Palensky, Frederick J., 4,996,243, Cl. 522-99.000.

Palmer, Darrell D.: *See*—
Erpelding, A. David; Palmer, Darrell D.; and Wilmer, Richard K., 4,996,623, Cl. 360-104.000.

Paneth, Eric: *See*—
Critchlow, David N.; Avis, Graham M.; Earlam, Sandra J. K.; Johnson, Karle J.; Smetana, Bruce A.; Westling, Gregory L.; Paneth, Eric; and Yehushua, Moshe, 4,996,697, Cl. 375-104.000.

Panzner, Ty. Moveable roping exercise target. 4,995,618, Cl. 273-367.000.

Paoletti, George J. Electric boxing game. 4,995,610, Cl. 273-85.00F.

Pape, Frank F.: *See*—
Lauterbach, Gerald; Pape, Frank F.; and Gramlich, Walter, 4,996,365, Cl. 568-427.000.

Paper Converting Machine Company: *See*—
Gould, Steven G., 4,995,141, Cl. 19-148.000.

Papke, Brian L.; and Bartley, Leonard S., Jr., to Texaco Inc. Process for preparing overbased metal sulfonates. 4,995,993, Cl. 252-25.000.

Par Technology Corporation: *See*—
Warnicki, Joseph W.; Rehkopf, Paul G.; Cambier, James L.; and Strods, Salvins J., 4,995,716, Cl. 351-212.000.

Paradygm Science & Technologies, Inc.: *See*—
Hanna, David A., 4,996,423, Cl. 250-281.000.
Schubert, W. Peter; and Wilke, Thomas A., 4,995,547, Cl. 228-124.000.

Parent, Philippe: *See*—
Khuri-Yakub, Butrus T.; Parent, Philippe; and Reinholdtsen, Paul A., 4,995,259, Cl. 73-593.000.

Parente, Richard E.; De La Cruz, Richard; and Helmstetter, Richard C., to Callaway Golf Company. Iron golf club heads. 4,995,609, Cl. 273-80.200.

Parisot, Daniel: *See*—
Puntener, Alois; and Parisot, Daniel, 4,996,303, Cl. 534-602.000.

Park, Heung Jong. Shock absorber for a car. 4,995,659, Cl. 293-107.000.

Park, Sung-Taek, to Prince Corporation. Switch. 4,996,401, Cl. 200-527.000.

Parker, D. A.: *See*—
Siegel, Jodie M.; Sternlieb, Herschel; Connolly, Timothy J.; Greenway, J. Michael; Parker, D. A.; and Simon, Arlene T., 4,995,151, Cl. 26-69.00R.

Parker, Samuel B.: *See*—
Olsson, Mark S.; Parker, Samuel B.; and Rimer, Douglas G., 4,996,635, Cl. 362-267.000.

Parme, Charles B.: *See*—
Brown, Paul D.; Godecker, William J.; and Parme, Charles B., 4,995,792, Cl. 417-366.000.

Parnell, Clyde B., to Fasco Industries, Inc. Built-in ironing center. 4,995,681, Cl. 312-242.000.

Parsons, Bryan N. V., to Jaguar Cars Limited. Transmission systems. 4,995,279, Cl. 74-199.000.

Pasquale, Antonio: *See*—
Marraccini, Antonio; Pasquale, Antonio; and Fiorani, Tiziana, 4,996,370, Cl. 568-674.000.

Paterson, James L.; and Smayling, Michael C., to Texas Instruments Incorporated. Erasable programmable memory. 4,996,668, Cl. 365-185.000.

Paton, Boris E.; Vasiliev, Vsevolod V.; Bogdanovsky, Valentin A.; Shelekhov, Konstantin V.; Gavva, Viktor M.; Bigdash, Vladimir D.; Tabunschik, Ivan A.; and Ilchishin, Andrei P. Arc-welding monitor. 4,996,409, Cl. 219-130.010.

Patterson, Gregory M. L.: *See*—
Moore, Richard E.; Furusawa, Eiichi; Norton, Ted R.; Patterson, Gregory M. L.; and Mynderse, Jon S., 4,996,229, Cl. 514-450.000.

Patteson, R. Mark; and Lynch, Samuel C., to Atlantic Richfield Company. Offshore well system and method. 4,995,763, Cl. 405-195.000.

Paul, Stewart N.: *See*—
Aston, David A.; and Paul, Stewart N., 4,995,944, Cl. 162-199.000.

Paul, Thomas: *See*—
Groth, Rolf; and Paul, Thomas, 4,995,895, Cl. 65-60.200.

Pausch, Josef, to General Resource Corporation. Elbow connection for pneumatic conveying system. 4,995,645, Cl. 285-127.000.

Pawelzik, Manfred; and Titze, Horst, to Friedrich Grohe Armaturenfabrik GmbH & Co. Mixing valve for single-lever faucet. 4,995,419, Cl. 137-316.000.

Pawlowski, Georg: *See*—
Wilharm, Peter; Merrem, Hans-Joachim; and Pawlowski, Georg, 4,996,301, Cl. 534-556.000.

Paymaster Corporation, The: *See*—
Koper, Robert P.; and Konieczka, Howard R., 4,995,315, Cl. 101-96.000.

Payvar, Parviz, to Borg-Warner Corporation. Groove pattern for high thermal capacity wet clutch. 4,995,500, Cl. 192-107.00R.

Pechiney Recherche Groupement D'Interet Economique: *See*—
Faure, Jean-Francois; and Dubost, Bruno, 4,995,920, Cl. 148-12.70A.

Pecht, Israel; and Hemmerich, Stefan, to Yeda Research & Development Co., Ltd. Cromolyn binding protein in highly purifed form, and methods for the isolation thereof. 4,996,296, Cl. 530-350.000.

Peck, James V.: *See*—
Minaskanian, Gevork; and Peck, James V., 4,996,199, Cl. 514-167.000.

Peczalski, Andrezj; Costa, Julio C.; and Conger, Jeffrey S., to Honeywell Inc. Hot clock complex logic. 4,996,454, Cl. 307-480.000.

Pedersen, Melvin H.: *See*—
Kilgrow, Donald C.; Kilgrow, Linda; and Pedersen, Melvin H., 4,995,756, Cl. 404-6.000.

Pedi, Frank, Jr.: *See*—
Bhagwat, Dileep; Iny, Oliver; and Pedi, Frank, Jr., 4,996,048, Cl. 424-80.000.

Pedro B. Macedo: *See*—
Barkatt, Aaron, 4,995,984, Cl. 210-670.000.

Peery, John R.: *See*—
Eckenhoff, James B.; Magruder, Judy A.; Cortese, Richard; Peery, John R.; and Wright, Jeremy C., 4,996,060, Cl. 424-473.000.

Pele, Michel: *See*—
Rouquier, Pierre; Pele, Michel; Ic, Andre ; and Crestey, Pierre, 4,995,236, Cl. 62-51.100.

Peled, Michael: *See*—
Fishler, Theodor-Morel; Peled, Michael; and Shorr, Leonard M., 4,996,276, Cl. 526-2927.500.

Pelikan Aktiengesellschaft: *See*—
Mecke, Norbert; and Krauter, Heinrich, 4,995,741, Cl. 400-120.000.

Pellet, Regis J.: *See*—
Gortsema, Frank P.; McCauley, John R.; Pellet, Regis J.; Miller, James G.; and Rabo, Jule A., 4,995,964, Cl. 208-112.000.

Pelrine, Bruce P.; and Wu, Margaret M., to Mobil Oil Corporation. Regeneration of reduced metal oxide oligomerization catalyst. 4,996,384, Cl. 585-530.000.

Pencom International Corp.: *See*—
Lee, Wai-Hon, 4,996,169, Cl. 437-209.000.

Pennestri, Domenick. Sewing needle with a threading assisting feature. 4,995,536, Cl. 223-102.000.

Penney, Carl M.: *See*—
Case, Allen W., Jr.; and Penney, Carl M., 4,996,693, Cl. 372-66.000.

Pennisi, Robert W.: *See*—
Davis, James L.; Pennisi, Robert W.; Nounou, Fadia; and Landreth, Bobby D., 4,995,921, Cl. 148-22.000.

Pennypacker, Frank C.: *See*—
Conners, Patrick J.; Stevens, Lawrence R.; Gaiser, Don R.; and Pennypacker, Frank C., 4,996,161, Cl. 436-132.000.

Performance Plus, Inc.: *See*—
Marmar, Joel L.; and Henderson, Brian R., 4,995,381, Cl. 128-79.000.

Pericomp Corporation: *See*—
Joannou, Kyriacos, 4,996,609, Cl. 360-57.000.

Perkin-Elmer Corporation, The: *See*—
Golay, Marcel, 4,995,163, Cl. 29-527.100.

Peroxid-Chemie GmbH: *See*—
Appl, Herbert; Gnann, Michael; Jahr, Wolfgang; and Rossberger, Erwin, 4,995,550, Cl. 228-175.000.

Perret, Michel: *See*—
Dufournet, Denis; and Perret, Michel, 4,996,398, Cl. 200-148.00A.
Thuries, Edmond; Dufournet, Denis; and Perret, Michel, 4,996,399, Cl. 200-148.00A.

Perricone, Ann. Safety device for elevators. 4,995,477, Cl. 187-1.00R.

Perrin, Patrice; and Pierron, Andre, to Rhone-Poulenc Chimie. Storage-stable organopolysiloxane compositions moisture-curable into elastomeric state. 4,996,112, Cl. 428-447.000.

Pershon, Paul: *See*—
Rappart, Alain; Loosdregt, Henri; Pershon, Paul; and Persohn, Philippe, 4,995,643, Cl. 285-4.000.

Persohn, Philippe: *See*—
Rappart, Alain; Loosdregt, Henri; Pershon, Paul; and Persohn, Philippe, 4,995,643, Cl. 285-4.000.

Persohn S.A.: *See*—
Rappart, Alain; Loosdregt, Henri; Pershon, Paul; and Persohn, Philippe, 4,995,643, Cl. 285-4.000.
Persson, Malte, to Forenade Well AB. Tape applying arrangement. 4,995,937, Cl. 156-543.000.
Perusich, Stephen A.; and Keating, James T., to Du Pont de Nemours, E. I., and Company. Coated cation exchange fabric and process. 4,996,098, Cl. 428-229.000.
Peter, Roland: *See*—
Czauderna, Bernhard; Nieberle, Juergen; Peter, Roland; and Nissen, Dietmar, 4,996,270, Cl. 525-531.000.
Peters, Elisabeth: *See*—
O'Malley, Sara; O'Malley, Michael H.; and Peters, Elisabeth, 4,996,707, Cl. 379-100.000.
Peterson, Charles A. Cooling tower liquid contact plate support system. 4,996,008, Cl. 261-111.000.
Peterson, Charles A.: *See*—
Vermes, Sheldon A.; Botts, David M.; and Peterson, Charles A., 4,995,976, Cl. 210-266.000.
Petitto, Angelo A.: *See*—
Petitto, Angelo S.; Petitto, Angelo A.; Petitto, James L.; and Marshall, George W., 4,995,783, Cl. 414-786.000.
Petitto, Angelo S.; Petitto, Angelo A.; Petitto, James L.; and Marshall, George W., to Petitto Mine Equipment, Inc. Material handling platform for material transport vehicle. 4,995,783, Cl. 414-786.000.
Petitto, James L.: *See*—
Petitto, Angelo S.; Petitto, Angelo A.; Petitto, James L.; and Marshall, George W., 4,995,783, Cl. 414-786.000.
Petitto Mine Equipment, Inc.: *See*—
Petitto, Angelo S.; Petitto, Angelo A.; Petitto, James L.; and Marshall, George W., 4,995,783, Cl. 414-786.000.
Petrick, Scott W.: *See*—
McDaniel, David L.; and Petrick, Scott W., 4,996,413, Cl. 250-208.100.
Pettit, George R.; and Singh, Sheo B., to Arizona Board of Regents. Combretastatin A-4. 4,996,237, Cl. 514-720.000.
Pews, R. Garth, to Dow Chemical Company, The. Process for the preparation of 3,5,6-trichloropyridin-2-ol. 4,996,323, Cl. 546-250.000.
Pfizer Hospital Products Group, Inc.: *See*—
Elkachouty, Ahmed A., 4,996,084, Cl. 427-133.000.
Pfizer Inc.: *See*—
McCarthy, Peter A., 4,996,345, Cl. 556-485.000.
Mylari, Banavara L.; and Zembrowski, William J., 4,996,204, Cl. 514-248.000.
Pfleger, Klaus: *See*—
Kanne, Friedrich; Pfleger, Klaus; Glomb, Hans; Arnold, Gerhard; Boettcher, Klaus; and Kursawe, Siegfried, 4,996,026, Cl. 422-106.000.
Pfluger, Ludwig, to Carl Ullrich Peddinghaus. Machinist's vise with adjustable pressure limiter. 4,995,599, Cl. 269-32.000.
PFU Limited: *See*—
Kanemitsu, Norio; Tabata, Yoshio; and Wakabayashi, Masaru, 4,996,603, Cl. 358-462.000.
Pham, Linh N.: *See*—
Zarabadi, Seyed R.; and Pham, Linh N., 4,996,499, Cl. 330-264.000.
Phan, Hieu D.; Carrier, Gary W.; Stockl, Rebecca R.; Tortorici, Frank J.; and Wulf, R. Gary, to Eastman Kodak Company. Ink composition containing a blend of a polyester and an acrylic polymer. 4,996,252, Cl. 524-88.000.
Phidea S.P.A.: *See*—
Valentini, Luigi; and Ceschel, Giancarlo, 4,995,385, Cl. 128-203.210.
Phillips, Douglas B., Sr. Tri-motion grinding fixture. 4,995,301, Cl. 51-219.00R.
Phillips Petroleum Company: *See*—
Burkinshaw, Jeffrey R.; and Gingerich, Leo L., 4,996,383, Cl. 585-516.000.
Gerhold, Bruce W.; and Anderson, Richard L., 4,996,387, Cl. 585-654.000.
Hays, George E.; and Classen, Theodore M., 4,995,961, Cl. 208-108.000.
Piasecki Aircraft Corporation: *See*—
Piasecki, Frank N., 4,995,572, Cl. 244-2.000.
Piasecki, Frank N., to Piasecki Aircraft Corporation. High altitude multi-stage data acquisition system and method of launching stratospheric altitude air-buoyant vehicles. 4,995,572, Cl. 244-2.000.
Pickering, John L., Jr.; and Nemet-Mavrodin, Margaret, to Mobil Oil Corp. Increased conversion of C_2–C_{12} aliphatic hydrocarbons to aromatic hydrocarbons using a highly purified recycle stream. 4,996,381, Cl. 585-413.000.
Piechnick, John J., to Power Reflex Pty. Ltd. Electrical converter utilizing switched uni-directional and bi-directional energy sources. 4,996,637, Cl. 363-16.000.
Piegay, Yves, to Skis Rossignol S. A. Vibration damper for ski. 4,995,630, Cl. 280-602.000.
Pierantozzi, Ronald; Miller, Mildred A.; Listemann, Mark L.; Gaffney, Thomas R.; and Coe, Charles G., to Air Products and Chemicals, Inc. Separation of amides with molecular sieves. 4,996,322, Cl. 564-216.000.
Pierron, Andre: *See*—
Perrin, Patrice; and Pierron, Andre, 4,996,112, Cl. 428-447.000.
Pietsch, Hanns; Kartheus, Holger; Holtzmann, Hans-Joachim; Sachau, Gunther; and Reul, Helmut, to Beiersdorf Aktiengesellschaft. Antithrombogenic, non-calcifying material and method of making articles for medical purposes. 4,996,054, Cl. 424-422.000.
Pigeon, Joseph P. R. M.: *See*—
Thomas, Robert M.; and Pigeon, Joseph P. R. M., 4,996,444, Cl. 307-269.000.
Pilkington plc: *See*—
Jenkins, Michael S.; Simpson, Andrew F.; and Porter, David A., 4,995,893, Cl. 65-18.200.
Martlew, David; and Rigby, Malcom J., 4,995,340, Cl. 118-715.000.
Pimpinella, Richard J.; Segelken, John M.; Tai, King L.; and Thompson, Ross J., to AT&T Bell Laboratories. Optical assembly comprising optical fiber coupling means. 4,995,695, Cl. 350-96.200.
Pink, William B.; and Ickes, William G., to Sheet Metal Industries, Inc. Carbon desorption heater. 4,995,808, Cl. 432-72.000.
Pinnavaia, Giuseppe R., to Texas Instruments Incorporated. Method for assembling components upon printed circuit boards. 4,995,156, Cl. 29-838.000.
Pioneer Electronic Corporation: *See*—
Hayashi, Ryutaro; and Kaneko, Noriaki, 4,995,799, Cl. 425-111.000.
Yoshio, Junichi, 4,996,679, Cl. 369-33.000.
Pioneer Hi-Bred International, Inc.: *See*—
Haefele, Douglas M.; Lamptey, Jonathan C.; and Marlow, Joseph L., 4,996,049, Cl. 424-93.000.
Piper-Mechadyne Limited: *See*—
Gayler, Robert J.; and Lancefield, Timothy M., 4,995,358, Cl. 123-188.00M.
Pirklbauer, Wilfried, to Voest-Alpine Industrieanlagenbau Gesellschaft m.b.H. Method of deoxiding and alloying steel. 4,995,907, Cl. 75-561.000.
Pitney Bowes Inc.: *See*—
Janatka, Karel, 4,995,934, Cl. 156-441.500.
Plath, Robert V. Wheeled suitcase and luggage support. 4,995,487, Cl. 190-18.00A.
Platone, Edoardo: *See*—
Tinucci, Laura; and Platone, Edoardo, 4,996,366, Cl. 568-454.000.
Platteschorre, Kornelis. Egg carton stacking-loading device and method. 4,995,785, Cl. 414-790.300.
Plessey Electronic Systems Corp.: *See*—
Liguori, Ralph; Goldhammer, Kurt R.; and Laermer, Lothar, 4,996,630, Cl. 361-412.000.
Ploog, Uwe: *See*—
Behler, Ansgar; and Ploog, Uwe, 4,996,364, Cl. 564-475.000.
Plowman, Arnold H.: *See*—
Plowman, Jeffrey D.; and Plowman, Arnold H., 4,995,759, Cl. 405-43.000.
Plowman, Jeffrey D.; and Plowman, Arnold H., to Multi-Flow Tube, Inc. Drainage tube construction. 4,995,759, Cl. 405-43.000.
Poa, David S.; Burris, Leslie; Steunenberg, Robert K.; and Tomczuk, Zygmunt, to United States of America, Energy. Apparatus and process for the electrolytic reduction of uranium and plutonium oxides. 4,995,948, Cl. 204-1.500.
Pohl GmbH & Co. KG: *See*—
von Schuckmann, Alfred, 4,995,521, Cl. 215-249.000.
Poinsot, Philippe: *See*—
Brecy, Andre ; and Poinsot, Philippe, 4,996,538, Cl. 346-74.300.
Polaroid Corporation: *See*—
Cocco, Vincent L.; and Grimes, Donald L., 4,996,681, Cl. 369-273.000.
Polioles, S. A. de C.U.: *See*—
Acosta, Roberto M., 4,996,310, Cl. 536-120.000.
Polymer Technology Corporation: *See*—
Ellis, Edward J.; and Ellis, Jeanne Y., 4,996,275, Cl. 526-245.000.
Poma of America, Inc.: *See*—
Mugnier, Jean-Francois, 4,995,319, Cl. 104-112.000.
Ponpipom, Mitree M.: *See*—
Biftu, Tesfaye; Bugianesi, Robert L.; Girotra, Nirindar N.; Ponpipom, Mitree M.; Sahoo, Soumya P.; and Kuo, Chan H., 4,996,203, Cl. 514-231.500.
Poore, William H.: *See*—
Geppelt, Elmo W.; and Poore, William H., 4,995,450, Cl. 165-104.210.
Popa, Jean-Michel: *See*—
Doussain, Claude; Gubelmann, Michel; and Popa, Jean-Michel, 4,996,376, Cl. 568-934.000.
Pope, Keith A., to Tektronix, Inc. Apparatus for connecting an IC device to a test system. 4,996,478, Cl. 324-158.00P.
Poplawski, John R.: *See*—
Juszak, Joseph J.; and Poplawski, John R., 4,995,642, Cl. 283-105.000.
Popp, Klaus: *See*—
Do-Thoi, Tha; and Popp, Klaus, 4,996,111, Cl. 428-432.000.
Poppell, Ralph, to Float-On Corporation. Boat hull latching device having positive retention means. 4,995,629, Cl. 280-414.100.
Porter, David A.: *See*—
Jenkins, Michael S.; Simpson, Andrew F.; and Porter, David A., 4,995,893, Cl. 65-18.200.
Porter, Neil: *See*—
Sutherland, Derek R.; Ramsay, Michael V. J.; Ward, John B.; Porter, Neil; Noble, Hazel M.; Fletton, Richard A.; and Noble, David, 4,996,228, Cl. 514-450.000.
Posedel, Zlatimir, to Asea Brown Boveri Ltd. Method and apparatus for inspecting laminated iron core stacks for interlamination shorts. 4,996,486, Cl. 324-545.000.
Posterick, Barry L.: *See*—
Entenmann, John K.; Hooke, John A.; Kampmeier, Eric E.; and Posterick, Barry L., 4,996,705, Cl. 379-91.000.

Potter, Thomas; and Seabury, Thomas, to Detector Systems, Inc. Vehicle communication system using existing roadway loops. 4,996,716, Cl. 455-41.000.
Potz, Karl: *See—*
Lorey, Manfred; and Potz, Karl, 4,995,974, Cl. 210-247.000.
Poujol, Jean-Pierre, deceased: *See—*
Schoeff, Nadine; and Poujol, Jean-Pierre, deceased, 4,996,057, Cl. 424-451.000.
Poujol, Raymonde: *See—*
Schoeff, Nadine; and Poujol, Jean-Pierre, deceased, 4,996,057, Cl. 424-451.000.
Poumey, Michel; and Charvet, Jacques, to Cableco; and Etablissements Jean Charvet. Inductive heated portable hot plate. 4,996,405, Cl. 219-10.493.
Power Reflex Pty. Ltd.: *See—*
Piechnick, John J., 4,996,637, Cl. 363-16.000.
Powers, Carol: *See—*
Becker, Paul; Powers, Carol; and Thompson, Mark S., 4,996,510, Cl. 338-21.000.
Powis, William L. Air-vapor barrier continuity device. 4,995,207, Cl. 52-210.000.
Pozzi, Enrico: *See—*
Greco, Alberto; Giordano, Sergio; Pozzi, Enrico; and Blasioli, Patrizia, 4,996,283, Cl. 528-80.000.
PPG Industries, Inc.: *See—*
Garrett, Jeffrey L.; Makitka, Harry; Sanchez, Richard J.; and Shepler, Gregory W., 4,995,892, Cl. 65-12.000.
Prados, Rafael R., to Telefonica De Espana, S.A. Screening edge mask for printed circuit board, with withdrawing-retaining mechanism. 4,995,820, Cl. 439-157.000.
Prakash, Nellikunja J.: *See—*
Edwards, Michael L.; McCarthy, James R.; and Prakash, Nellikunja J., 4,996,308, Cl. 536-26.000.
Pralus, Christian; and Schirmann, Jean-Pierre, to Atochem. Production of hydrogen peroxide. 4,996,039, Cl. 423-584.000.
Prasad, Ravi: *See—*
O'Brien, Michael J.; Spence, Jean E.; Skiff, Ronald H.; Vogel, Gerald J.; and Prasad, Ravi, 4,996,317, Cl. 544-274.000.
Pratt, George C.; and Whitney, Warren J., Jr., to Federal-Mogul Corporation. Engine bearing alloy composition and method of making same. 4,996,025, Cl. 420-554.000.
Pratt, Harold R., II: *See—*
Beer, Stephen K.; and Pratt, Harold R., II, 4,996,483, Cl. 324-321.000.
Precision Castparts Corp.: *See—*
Sturgis, David H., 4,996,175, Cl. 501-126.000.
Precision Valve Corporation: *See—*
Naku, Virgil, 4,995,417, Cl. 137-231.000.
Preier, Horst M.: *See—*
Riedel, Wolfgang; Knothe, Manfred; Grisar, Roland; Wolf, Helmut; and Preier, Horst M., 4,995,725, Cl. 356-334.000.
Preiss, Wolfgang: *See—*
Reumann, Manfred; Preiss, Wolfgang; and Kubicek, Andreas, 4,995,251, Cl. 72-132.000.
Preissler, Christopher M.; and Foshee, William R., deceased (Foshee, Carolyn S., administratix), to Best Lock Corporation. Door handle assembly with hollow knob and interchangeable lock core. 4,995,249, Cl. 70-224.000.
Prescott, Alain. Manhole cover annular support for repaved street. 4,995,757, Cl. 404-26.000.
Pretscher, Manfred: *See—*
Moller, Rainer; Pretscher, Manfred; and Schmidt, Anton, 4,995,737, Cl. 384-607.000.
Price, James A., Jr. Universal eye patch. 4,995,114, Cl. 2-15.000.
Priha, Matti: *See—*
Tervamaki, Jukka; Heinonen, Mauno; Priha, Matti; and Koivisto, Juha, 4,995,432, Cl. 141-130.000.
Prince Corporation: *See—*
Park, Sung-Taek, 4,996,401, Cl. 200-527.000.
Prince Industrial Development Co., Ltd.: *See—*
Yoshinaga, Sadao; and Mashine, Hiroyoshi, 4,995,171, Cl. 34-97.000.
Princeton University, The Trustees of: *See—*
Taylor, Edward C.; Kuhnt, Dietmar G.; Shih, Chuan; and Grindey, Gerald B., 4,996,206, Cl. 514-258.000.
Wang, Zhao Z.; and Ong, Nai-Phuan, 4,996,186, Cl. 505-1.000.
Prindle, William: *See—*
Skerker, Robert B.; and Prindle, William, 4,996,404, Cl. 219-10.55E.
Probst, Martin; Schaffarzyk, Herbert; and Schaffarzyk, Walter. Scraping device for making a subgrade. 4,995,760, Cl. 404-119.000.
Procal: *See—*
Devouassoux, Serge; Marchiset, Michel; and Saxod, Michel, 4,995,621, Cl. 277-37.000.
Process Bonding, Inc.: *See—*
Steinke, David M.; Blankenship, Michael; Satterfield, Marshall G.; and Gardner, Philip D., Sr., 4,996,090, Cl. 428-71.000.
Procter & Gamble Company, The: *See—*
Seiden, Paul; and White, Robert L., 4,996,074, Cl. 426-601.000.
Product Research and Development: *See—*
Solomon, Donald F., 4,995,793, Cl. 417-403.000.
Profera, Charles E., Jr., to General Electric Company. Shortened dual-mode horn antenna. 4,996,535, Cl. 343-786.000.
Public Health Laboratory Service Board: *See—*
Wiles, Martin C.; Schiffrin, David J.; and Clarke, David J., 4,995,960, Cl. 204-418.000.
Pudenz-Schulte Medical Research Corporation: *See—*
Heindl, Alfons; Laguette, Stephen W.; and Lintula, Leanne M., 4,995,856, Cl. 604-8.000.
Pugh, David R.: *See—*
Ford, David A.; Higginbotham, Gordon J. S.; Pugh, David R.; and Kumar, Naresh, 4,995,593, Cl. 266-227.000.
Puig, Ana E. Neurosurgical clip applier. 4,995,876, Cl. 606-142.000.
Pullen, Lawrence H. Vacuum apparatus for debris collection. 4,995,138, Cl. 15-340.100.
Puntener, Alois; and Parisot, Daniel, to Ciba-Geigy Corporation. Preparation of 1:2 metal complex dyes by coupling in the presence of a metal donor in an inert gas atmosphere. 4,996,303, Cl. 534-602.000.
Purcell, Earl E., Jr., to Ensign-Bickford Optics Company. Angled optical fiber input end face and method for delivering energy. 4,995,691, Cl. 350-96.150.
Purdue Research Foundation: *See—*
Cook, William A.; Fearnot, Neal E.; and Geddes, Leslie A., 4,995,390, Cl. 128-419.0PG.
Purho, Pekka: *See—*
Ljokkoi, Risto; Niiranen, Tapani; Purho, Pekka; Savolainen, Erkki; and Siitonen, Jari, 4,995,991, Cl. 210-797.000.
Putzig, Donald E.; and Smeltz, Kenneth C., to Du Pont de Nemours, E. I., and Company. Cross-linking titanum & zirconium; chelates & Their use. 4,996,336, Cl. 556-55.000.
PWT Projects Limited: *See—*
Weston, Philip A., 4,995,990, Cl. 210-793.000.
Pyke, James B.; Bauer, Richard G.; and Burlett, Donald J., to Goodyear Tire & Rubber Company, The. Polyester reinforced rubber. 4,996,262, Cl. 525-177.000.
Pyke, James B.; Bauer, Richard G.; Cohen, Martin P.; and Handa, Pawan K., to Goodyear Tire & Rubber Company, The. High modulus rubber composition. 4,996,263, Cl. 525-178.000.
Qantix Corporation: *See—*
Brown, John W., 4,995,701, Cl. 350-276.00R.
Quinn, Candace J.: *See—*
Beall, George H.; Dickinson, James E., Jr.; and Quinn, Candace J., 4,996,172, Cl. 501-45.000.
R. J. Reynolds Tobacco Company: *See—*
Lettau, K. Dieter, 4,995,405, Cl. 131-84.100.
Rabo, Jule A.: *See—*
Gortsema, Frank P.; McCauley, John R.; Pellet, Regis J.; Miller, James G.; and Rabo, Jule A., 4,995,964, Cl. 208-112.000.
Radiometer A/S: *See—*
Jensen, Ole J.; and Melberg, Steen G., 4,995,391, Cl. 128-635.000.
Radon Control, Inc.: *See—*
Weaver, Steven K., 4,995,309, Cl. 98-42.070.
Rai, Chandra S.; and Sondergeld, Carl H., to Amoco Corporation. Method an system of geophysical exploration. 4,996,421, Cl. 250-255.000.
Rai, Dinker B. Method for descending venography. 4,995,878, Cl. 606-194.000.
Rampley, Thomas N.; and Hoffarth, Paul G., to Bryan Steam Corporation. Flue gas recirculation system. 4,995,807, Cl. 431-9.000.
Ramsay, Michael V. J.: *See—*
Sutherland, Derek R.; Ramsay, Michael V. J.; Ward, John B.; Porter, Neil; Noble, Hazel M.; Fletton, Richard A.; and Noble, David, 4,996,228, Cl. 514-450.000.
Randolph, Travis M. Machine for stretching fabric over a panel frame. 4,995,178, Cl. 38-102.000.
Rankin, Richard A.: *See—*
Kotter, Dale K.; and Rankin, Richard A., 4,996,531, Cl. 341-157.000.
Ranon, Peter M., to United States of America, Air Force. Droop compensated PFN driven transformer for generating high voltage, high energy pulses. 4,996,494, Cl. 328-65.000.
Rapid S.A.: *See—*
DuBost, Dominique, 4,995,673, Cl. 301-37.00P.
Rappart, Alain; Loosdregt, Henri; Pershon, Paul; and Persohn, Philippe, to Manufacture d'Appareillage Electriquie de Cahors; Lyonnaise des Eaux; and Persohn S.A. Device for fixing a water meter on to a base and method relating thereto. 4,995,643, Cl. 285-4.000.
Rarden, Gary M. Torque transmitting tool for removing grommets from concrete. 4,995,299, Cl. 81-176.150.
Raschkowski, Boleslaus: *See—*
Buchwald, Hans; and Raschkowski, Boleslaus, 4,995,908, Cl. 106-38.220.
Rasmussen, Jerald K.; Heilmann, Steven M.; and Palensky, Frederick J., to Minnesota Mining and Manufacturing Company. Curable acrylamido oligomer compositions with initiator, and cured products. 4,996,243, Cl. 522-99.000.
Rathjen, Barbel: *See—*
Love, Graham; Schellhaass, Karl; Rathjen, Barbel; and Schwarz, Jurgen, 4,996,066, Cl. 426-77.000.
Rau, Gunter: *See—*
Knoch, Martin; Reul, Helmut; and Rau, Gunter, 4,995,881, Cl. 623-2.000.
Rau, Norbert: *See—*
Krieg, Manfred; Rau, Norbert; and Ude, Werner, 4,996,109, Cl. 428-304.400.
Raychem Corporation: *See—*
Becker, Paul; Powers, Carol; and Thompson, Mark S., 4,996,510, Cl. 338-21.000.
Borden, Thomas E.; Nestor, Charles R.; and Solano, David W., 4,995,822, Cl. 439-161.000.

Raynolds, Peter W.; and Bagrodia, Shriram, to Eastman Kodak Company. Ink reservoir containing modified polyester fibers. 4,996,107, Cl. 428-400.000.
Raytheon Company: *See—*
Tustison, Randal W.; Montanari, Dennis; Varitimos, Thomas; and diBenedetto, Bernard, 4,995,684, Cl. 350-1.600.
RCA Licensing Corporation: *See—*
Anderson, William D., 4,996,599, Cl. 358-191.100.
Duffield, David J., 4,996,597, Cl. 358-181.000.
Reardon, Edward J.: *See—*
Lazarus, Richard M.; Reardon, Edward J.; and Dixit, Sunit S., 4,996,122, Cl. 430-17.000.
Rebjock, Alain, to Schlumberger Industries. Method of manufacturing a card having electronic memory and a card obtained by performing said method. 4,996,411, Cl. 235-488.000.
Rebstock, Roland B. Personalized ornament having a design outline. 4,996,087, Cl. 428-11.000.
Redeker, Dale R. Multilayer cleansing bar. 4,996,000, Cl. 252-92.000.
Redford, Gary R., to Hughes Aircraft Company. Measurement of optical attenuation along the length of bent optical fibers. 4,996,420, Cl. 250-227.240.
Reed Devices, Inc.: *See—*
Geib, Lawrence E.; Bailey, William R.; and Zielinski, James S., 4,995,829, Cl. 439-409.000.
Reed, Paul A.: *See—*
Talgam, Yoav; Reed, Paul A.; Haddad, Elie; and Klingshirn, James A., 4,996,641, Cl. 364-200.000.
Reed, Ray M. Tile shear testing apparatus and method. 4,995,262, Cl. 73-842.000.
Reed Tool Company Limited: *See—*
Barr, John D.; and Newton, Thomas A., Jr., 4,995,887, Cl. 51-295.000.
Reed, Victoria K. Amusement system including riding capsule device. 4,995,603, Cl. 272-18.000.
Reed, Wilmer H., III; and Gold, Ronald R., to United States of America, National Aeronautics and Space Administration. Torsional suspension system for testing space structures. 4,995,272, Cl. 73-865.600.
Reel-Tech Inc.: *See—*
Hall, Douglas R., 4,995,157, Cl. 29-740.000.
Rees, John M. H.; Robinson, Brian; and Cox, Brian, to Victoria University of Manchester, The. New organic compounds having opioid properties. 4,996,223, Cl. 514-410.000.
Regan, John R.; and Neuenschwander, Kent W., to Rhone-Poulenc Rorer Pharmaceuticals Inc. HMG-CoA reductase inhibitors. 4,996,234, Cl. 514-563.000.
Regnault, John C., to BT&D Technologies Limited. Device mounting. 4,995,546, Cl. 228-123.000.
Rehberg, Karl H. Pretreatment of cellulosic material with carbon dioxide. 4,995,943, Cl. 162-63.000.
Rehkopf, Paul G.: *See—*
Warnicki, Joseph W.; Rehkopf, Paul G.; Cambier, James L.; and Strods, Salvins J., 4,995,716, Cl. 351-212.000.
Reich, Ferdinand, to Karl Mayer Testilmaschinenfabrik GmbH. Warp knitting machine with at least one bar. 4,995,246, Cl. 66-125.00R.
Reichborn, Per K., to Goodway Tools Corporation. Appliance for ash removal. 4,995,137, Cl. 15-327.100.
Reichmanis, Elsa: *See—*
Houlihan, Francis M.; Reichmanis, Elsa; and Thompson, Larry F., 4,996,136, Cl. 430-313.000.
Reiflock-Umwelttechnik Margot Reichmann: *See—*
Gott, Erich, 4,995,981, Cl. 210-603.000.
Reinholdtsen, Paul A.: *See—*
Khuri-Yakub, Butrus T.; Parent, Philippe; and Reinholdtsen, Paul A., 4,995,259, Cl. 73-593.000.
Reinking, Klaus: *See—*
Heinz, Hans-Detlef; Kohler, Burkhard; Meyer, Rolf-Volker; Reinking, Klaus; and Sommer, Alexa, 4,996,256, Cl. 524-112.000.
Remy, David C.: *See—*
Baldwin, John J.; and Remy, David C., 4,996,321, Cl. 546-194.000.
Renault, Christophe, to Valeo Thermique Moteur Hutchinson. Rapid action coupling system for a heat exchanger fluid tank integral with an expansion vessel. 4,995,449, Cl. 165-76.000.
Renes, Harrie: *See—*
de Hey, Johannes T.; Renes, Harrie; and Visser, Jan, 4,996,069, Cl. 426-248.000.
Renishaw plc: *See—*
Chaney, Raymond J., 4,996,416, Cl. 250-225.000.
Renk Aktiengesellschaft: *See—*
Zaunberger, Franz X., 4,995,276, Cl. 74-89.150.
Reul, Helmut: *See—*
Knoch, Martin; Reul, Helmut; and Rau, Gunter, 4,995,881, Cl. 623-2.000.
Pietsch, Hanns; Kartheus, Holger; Holtzmann, Hans-Joachim; Sachau, Gunther; and Reul, Helmut, 4,996,054, Cl. 424-422.000.
Reumann, Manfred; Preiss, Wolfgang; and Kubicek, Andreas, to Hamburger Stahlwerke GmbH; and Schwerdtfeger & Kubicek Systemtechnik GmbH & Co. KG. System for trimming leading and trailing ends from a wire coil. 4,995,251, Cl. 72-132.000.
Reuter, Wolfgang, to Leybold Aktiengesellschaft. Smelting crucible. 4,995,595, Cl. 266-275.000.
Revlon, Inc.: *See—*
Mercado, Clara G.; and Krog, Ann M., 4,996,044, Cl. 424-64.000.
Reynolds, Fred W. Method of obtaining usable hydrocolloid impression material. 4,995,812, Cl. 433-214.000.
Rheinmetall GmbH: *See—*
Loffler, Markus; and Braunsberger, Ulrich, 4,996,455, Cl. 310-12.000.
Wallow, Peter, 4,995,573, Cl. 244-3.240.
Rheon Automatic Machinery Co., Ltd.: *See—*
Hirabayashi, Koichi, 4,995,804, Cl. 425-238.000.
Rhoades, Lawrence J., to Extrude Hone Corporation. Orifice sizing using chemical, electrochemical, electrical discharge machining, plating, coating techniques. 4,995,949, Cl. 204-15.000.
Rhone-Poulenc Chimie: *See—*
Arpin, Rene, 4,996,285, Cl. 528-117.000.
Doussain, Claude; Gubelmann, Michel; and Popa, Jean-Michel, 4,996,376, Cl. 568-934.000.
Perrin, Patrice; and Pierron, Andre, 4,996,112, Cl. 428-447.000.
Rhone-Poulenc Inc.: *See—*
Spooner, James P.; and Stiles, Alvin B., 4,996,031, Cl. 423-213.200.
Rhone-Poulenc Rorer Pharmaceuticals Inc.: *See—*
Regan, John R.; and Neuenschwander, Kent W., 4,996,234, Cl. 514-563.000.
Rhythm Motor Parts Mfg., Co., Ltd.: *See—*
Ishii, Shoju, 4,995,754, Cl. 403-132.000.
Rib Loc Australia Pty. Ltd.: *See—*
Menzel, Stanley W. O., 4,995,929, Cl. 156-187.000.
Ricci, Richard J.; and Gebhardt, Wallace E., to Federal-Mogul Corporation. Self adjusting switch. 4,996,400, Cl. 200-345.000.
Richard, Heinz. Method and apparatus for cleaving wafers. 4,995,539, Cl. 225-2.000.
Richard Wolf GmbH: *See—*
Ams, Felix; Baier, Manfred; and Schafer, Roland, 4,995,877, Cl. 606-180.000.
Richards, John E. Locking ratchet wrench. 4,995,297, Cl. 81-126.000.
Richardson-Vicks, Inc.: *See—*
Kelleher, William J.; and Carpanzano, Anthony E., 4,996,047, Cl. 424-79.000.
Richeson, Donald E.; and Tweedie, Judith A., to Goodyear Tire & Rubber Company, The. Polyester composition which is particularly suitable for use in thermoforming thin walled articles. 4,996,269, Cl. 525-444.000.
Richey, Warren F.: *See—*
Hausman Hazlitt, Andrea J.; and Richey, Warren F., 4,996,160, Cl. 436-2.000.
Ricoh Company, Ltd.: *See—*
Murayama, Noboru, 4,996,594, Cl. 358-136.000.
Nakadai, Yoshikazu; Taranishi, Daiya; Hirokawa, Koichi; and Matsumoto, Nobuki, 4,995,602, Cl. 271-207.000.
Sasaki, Masaomi; and Aruga, Tomotsu, 4,996,362, Cl. 564-315.000.
Shirasugi, Kouji, 4,996,564, Cl. 355-235.000.
Suzuki, Seizoh; and Endou, Osamu, 4,995,710, Cl. 350-480.000.
Yoshimura, Tsuyoshi; and Yamakawa, Takeshi, 4,996,561, Cl. 355-202.000.
Riedel, Wolfgang; Knothe, Manfred; Grisar, Roland; Wolf, Helmut; and Preier, Horst M., to Fraunhofer-Gesellschaft zur Forderung der Angewandten Forshung E.V. Monochromator arrangement. 4,995,725, Cl. 356-334.000.
Rieger, Robert; and Tilly, Bodo, to Messerschmitt-Bolkow-Blohm GmbH. Fiber optical beam splitting device. 4,995,694, Cl. 350-96.190.
Rieter Machine Works, Ltd.: *See—*
Binder, Rolf; and Hanselmann, Daniel, 4,995,142, Cl. 19-80.00R.
Rieuvernet, Pierre: *See—*
Garrigues, Jean-Claude; Laulhe, Rene; and Rieuvernet, Pierre, 4,995,305, Cl. 92-138.000.
Rigby, Malcom J.: *See—*
Martlew, David; and Rigby, Malcom J., 4,995,340, Cl. 118-715.000.
Rimer, Douglas G.: *See—*
Olsson, Mark S.; Parker, Samuel B.; and Rimer, Douglas G., 4,996,635, Cl. 362-267.000.
Rite-Hite Corporation: *See—*
Hahn, Norbert; and Naegeli, Robert W., 4,995,130, Cl. 14-71.300.
Rivers-Bland, Simon A. S.: *See—*
Morgan, James N.; and Rivers-Bland, Simon A. S., 4,995,212, Cl. 52-646.000.
Rizzuto, Dennis: *See—*
Seale, Robert; Rizzuto, Dennis; and Satin, Harold, 4,995,840, Cl. 440-66.000.
Robbins, Inc.: *See—*
Niese, Michael; and Stoehr, James H., 4,995,210, Cl. 52-391.000.
Robbins, Murray: *See—*
Kourtakis, Kostantinos; and Robbins, Murray, 4,996,189, Cl. 505-1.000.
Robert Bosch GmbH: *See—*
Denz, Helmut; and Herden, Werner, 4,995,365, Cl. 123-479.000.
Kuhbauch, Gerd; and Schaller, Gotthilf, 4,995,135, Cl. 15-250.210.
Langenbacher, Markus; and Maier, Gernot, 4,995,506, Cl. 198-814.000.
Robert R. Gerzel: *See—*
Nusbaum, Howard G., 4,995,774, Cl. 414-544.000.
Robertson, David W.; and Wong, David T., to Eli Lilly and Company. 3,4-Diphenylbutanamines. 4,996,235, Cl. 514-649.000.
Robertson, Gerald F.; Moyer, Ross A.; and McManus, John R., to Carrier Corporation. Method and apparatus for internally enhancing heat exchanger tubing. 4,995,252, Cl. 72-194.000.
Robertson, Thomas: *See—*
Kegan, Neil J.; Hitchens, Ian; Robertson, Thomas; and Whitehouse, Paul A., 4,995,592, Cl. 266-44.000.

Robin, Mark L.: *See*—
Halpern, Donald F.; and Robin, Mark L., 4,996,371, Cl. 568-683.000.

Robinson, Brian: *See*—
Rees, John M. H.; Robinson, Brian; and Cox, Brian, 4,996,223, Cl. 514-410.000.

Robinson, Jennifer: *See*—
Gracey, Michael; Hopkins, Frank; Robinson, Jennifer; and Snow, Stephen, 4,996,232, Cl. 514-474.000.

Robinson Knife Manufacturing Co., Inc.: *See*—
Skerker, Robert B.; and Prindle, William, 4,996,404, Cl. 219-10.55E.

Rockwell International Corporation: *See*—
Chang, Mau-Chung F.; and Asbeck, Peter M., 4,996,165, Cl. 437-31.000.
Nelson, Blaine J., 4,996,698, Cl. 375-118.000.

Rodas, Wilson A. Hairdresser foot rest. 4,995,670, Cl. 297-423.000.

Rodaway, Shirley J.: *See*—
Lutz, Albert W.; and Rodaway, Shirley J., 4,995,903, Cl. 71-121.000.

Rody, Jean: *See*—
Leppard, David G.; Slongo, Mario; and Rody, Jean, 4,996,326, Cl. 548-261.000.

Rogers Corporation: *See*—
Nelson, Gregory H.; Lebow, Sanford; and Nogavich, Eugene, 4,995,941, Cl. 156-630.000.

Rohm GmbH: *See*—
Krieg, Manfred; Rau, Norbert; and Ude, Werner, 4,996,109, Cl. 428-304.400.

Rohm, Gunter H. Sensor-equipped actuator for power chuck. 4,995,303, Cl. 92-5.00R.

Rohr, Franz J.: *See*—
Chu, Wing F.; and Rohr, Franz J., 4,996,117, Cl. 428-633.000.

Rolls-Royce plc: *See*—
Ford, David A.; Higginbotham, Gordon J. S.; Pugh, David R.; and Kumar, Naresh, 4,995,593, Cl. 266-227.000.

Ronsen, Bruce; Arora, Sudershan K.; and Thomas, Albert V., to Greenwich Pharmaceuticals Inc. Derivatives of α,D-glucofuranose or α,D-allofuranose and intermediates for preparing these derivatives. 4,996,195, Cl. 514-23.000.

Rorer, Morris P., to Du Pont de Nemours, E. I., and Company. Herbicidal sulfonamides. 4,995,901, Cl. 71-93.000.

Rose, Howard; and McAffer, Ian G. C., to Rose, Howard. Ampoules. 4,995,519, Cl. 215-32.000.

Rose-Plastic GmbH: *See*—
Rosler, Peter, 4,995,513, Cl. 206-446.000.

Rosenow, Barry L., to Tektronix, Inc. Method of displaying acquired data. 4,996,654, Cl. 364-521.000.

Rosenquist, Frederick T.: *See*—
Bonora, Anthony C.; and Rosenquist, Frederick T., 4,995,430, Cl. 141-98.000.

Rosenthal, Manfred, to U.S. Philips Corporation. Office machine. 4,995,746, Cl. 400-616.200.

Rosler, Peter, to Rose-Plastic GmbH. Container for oblong articles. 4,995,513, Cl. 206-446.000.

Ross, Stanley E.; and Nasser, AlexSandra C., to Henkel Corporation. Polyalphaolefin emulsions for fiber and textile applications. 4,995,884, Cl. 8-115.600.

Rossberger, Erwin: *See*—
Appl, Herbert; Gnann, Michael; Jahr, Wolfgang; and Rossberger, Erwin, 4,995,550, Cl. 228-175.000.

Roth, Charles H., Jr.: *See*—
Howell, David A.; Hydeman, Jeffrey E.; Slater, Jeffrey L.; Bodnar, Richard J.; Golick, Leonard R.; Sekera, Robert S.; and Roth, Charles H., Jr., 4,995,158, Cl. 29-723.000.

Rothenberger, Harold: *See*—
Humphrey, William D.; and Rothenberger, Harold, 4,995,591, Cl. 256-34.000.

Rothfuss, Hans; and Keutgen, Peter, to Didier-Werke AG. Apparatus for repairing a perforated brick in a metallurgical vessel. 4,995,596, Cl. 266-281.000.

Rouquier, Pierre; Pele, Michel; Ic, Andre ; and Crestey, Pierre, to Societe Anonyme de Telecommunications. Cryostatic device for a radiation detector. 4,995,236, Cl. 62-51.100.

Roussel Uclaf: *See*—
Krief, Alain; and Dumont, Willy, 4,996,349, Cl. 560-124.000.

Rowan, Timothy M.; and Merrison, John C., to Allen-Bradley Company, Inc. Electric motor speed control apparatus and method. 4,996,470, Cl. 318-772.000.

ROWO Rohr und Kanal Reinigungsgeraete GmbH: *See*—
Seitz, Reiner, 4,995,132, Cl. 15-104.330.

Royer, C. Richard. Soil sterilization apparatus. 4,995,190, Cl. 47-1.010.

Royer, Garfield P.: *See*—
Joung, John J.; Akin, Cavit; and Royer, Garfield P., 4,996,150, Cl. 435-161.000.

Rozek, Roy J.: *See*—
Hetzel, Thomas; and Rozek, Roy J., 4,995,795, Cl. 417-571.000.

Rozendaal, Ewoud: *See*—
Flipse, Abraham R.; Kay, Peter J.; and Rozendaal, Ewoud, 4,996,023, Cl. 419-12.000.

Rudolph, Georg, to Wandel & Goltermann GmbH & Co. Digitally settable frequency divider, especially for a frequency synthesizer. 4,996,699, Cl. 377-49.000.

Rudoy, Edward, to ITT Corporation. Strain relief IDC connector. 4,995,827, Cl. 439-405.000.

Rudoy, Edward: *See*—
Goodman, David S.; and Rudoy, Edward, 4,995,828, Cl. 439-405.000.

Ruigrok, Jacobus J. M.; Zieren, Victor; Enz, Ulrich E.; and Druyvesteyn, Willem F., to U.S. Philips Corporation. Superconducting device for reading information from a magnetic recording medium. 4,996,621, Cl. 360-126.000.

Rundzaitis, Alfons: *See*—
Gentry, Jefferson L.; Rundzaitis, Alfons; and Hilger, Ronald O., 4,995,155, Cl. 30-41.000.

Ruof, Edgar J.: *See*—
Moseley, Douglas D.; and Ruof, Edgar J., 4,995,483, Cl. 188-162.000.

Ruppert, Heinrich: *See*—
Bottenbruch, Ludwig; Ruppert, Heinrich; Isaacs, Neil S.; and Latham, Kenneth G., 4,996,373, Cl. 568-727.000.

Rush, Robert E. Air circulating system for a person operating an engine powered piece of agricultural equipment. 4,995,306, Cl. 98-1.000.

Ryczek, William F.: *See*—
Kellems, Kenneth K.; Ryczek, William F.; and Smith, Douglas R., 4,995,323, Cl. 108-157.000.

S. Eletro-Acustica S.A.: *See*—
Bittencourt, Helio T., 4,996,713, Cl. 381-190.000.

Sabee, Reinhardt N. Method and apparatus for forming and transporting elastic ribbons. 4,995,928, Cl. 156-164.000.

Sachau, Gunther: *See*—
Pietsch, Hanns; Kartheus, Holger; Holtzmann, Hans-Joachim; Sachau, Gunther; and Reul, Helmut, 4,996,054, Cl. 424-422.000.

Saeki, Kenji; Fukuhara, Hiroshi; Agoo, Tokinori; Taguchi, Toru; Miki, Hisaya; Haneda, Yutaka; and Yoshimoto, Sadao, to Mitsui Petrochemical Industries, Ltd. Process for oxidizing 2,6-diisopropylnaphthalene. 4,996,372, Cl. 568-717.000.

Saeki, Yoshihiko: *See*—
Tokuda, Kanji; Saeki, Yoshihiko; Sakamoto, Kiichiro; and Matsumoto, Fumio, 4,996,558, Cl. 355-50.000.

Sagami Chemical Research Center: *See*—
Umemoto, Teruo; Tomita, Kyoichi; Kawada, Kosuke; and Tomizawa, Ginjiro, 4,996,320, Cl. 546-9.000.

Sagawa, Masato, to Masato Sagawa. Permanent magnet having improved heat-treatment characteristics and method for producing the same. 4,995,905, Cl. 75-244.000.

Sager, Steven: *See*—
Schantz, Spencer; Janz, Ronald J.; Christiansen, Gary; and Sager, Steven, 4,995,650, Cl. 292-201.000.

Saho, Takahiro; Akutsu, Yoshinori; Nakano, Takaharu; and Ohtake, Nobumasa, to Chisso Corporation. Polyorganosiloxane compounds with amino group. 4,996,280, Cl. 528-15.000.

Sahoo, Soumya P.: *See*—
Biftu, Tesfaye; Bugianesi, Robert L.; Girotra, Nirindar N.; Ponpipom, Mitree M.; Sahoo, Soumya P.; and Kuo, Chan H., 4,996,203, Cl. 514-231.500.

Saijo, Yoshihiro: *See*—
Wakabayashi, Shigeru; Saijo, Yoshihiro; Yamane, Yoshitaka; and Fujikawa, Yasuji, 4,995,431, Cl. 141-116.000.

Saimoto, Tetsuro, to Yazaki Corporation. Bus bar interlayer connector structure in junction box. 4,995,818, Cl. 439-74.000.

Saint Georges Chaumet, Bertrand. Device for applying a liquid or semi-paste substance on a surface. 4,995,751, Cl. 401-135.000.

Saito, Hiroyuki, to Nippon Seiko Kabushiki Kaisha. Magnetic sensor actuation system suitable for use in passive seat belt system. 4,995,640, Cl. 280-804.000.

Saito, Kenji; and Kimura, Hiroshi, to Toshiba Silicone Co., Ltd. Surface-treated polyorganosilsesquioxane fine powder. 4,996,257, Cl. 524-262.000.

Saito, Mitsuru; Matsumora, Satoru; and Watanabe, Yasushi, to Alps Electric Co., Ltd. Conductive composition and method for manufacturing printed circuit substrate. 4,996,005, Cl. 252-512.000.

Saito, Osamu; Kamezaki, Hisamitsu; Suenaga, Masashi; Nagai, Ryo; Iuchi, Shinichiro; Watanabe, Hitoshi; and Fujiwara, Hideo, to Hitachi Maxell, Ltd. Optical data recording medium. 4,996,089, Cl. 428-64.000.

Saitou, Mitsuo: *See*—
Inoue, Noriyuki; Hirano, Katsumi; and Saitou, Mitsuo, 4,996,137, Cl. 430-378.000.

Saitou, Satoshi, to Kabushiki Kaisha Toshiba. Radiation detector. 4,996,432, Cl. 250-370.010.

Sakaguchi, Sumio: *See*—
Shinto, Hiroaki; Sakaguchi, Sumio; and Asagiri, Katuki, 4,995,638, Cl. 280-731.000.

Sakaguchi, Yasuo; Takegawa, Ichiro; Takemoto, Makoto; and Murase, Masanori, to Fuji Xerox Co., Ltd. Electrophotographic photoreceptor containing a fluorine lubricating agent layer. 4,996,125, Cl. 430-66.000.

Sakaguchi, Yoshiyuki: *See*—
Kobayashi, Takeshi; Tonouchi, Masayoshi; and Sakaguchi, Yoshiyuki, 4,996,191, Cl. 505-1.000.

Sakai Chemical Industry Co., Ltd.: *See*—
Yoshimoto, Masafumi; Nakatsuji, Tadao; and Sato, Noriaki, 4,996,015, Cl. 264-177.110.

Sakai, Shuzo: *See*—
Mitsuhashi, Masakazu; Sakai, Shuzo; and Miyake, Toshio, 4,996,196, Cl. 514-53.000.

Sakai, Yoshio: *See*—
Fujiwara, Michio; Matsumaru, Hiroshi; Kobayashi, Yasushi; Sakai, Yoshio; Yoneda, Kenzi; Dohi, Osamu; and Noguchi, Akihiko, 4,995,479, Cl. 187-135.000.

Sakama, Mitsunori: *See*—
Inujima, Takashi; Yamazaki, Shunpei; Konuma, Toshimitsu; Hamatani, Toshiji; Sakama, Mitsunori; Yamaguchi, Toshiharu; and Kobayashi, Ippei, 4,995,706, Cl. 350-350.00S.

Sakamoto, Hiroshi: *See*—
Matsui, Hideki; Hagiuda, Nobuyoshi; Yokonuma, Norikazu; Sakamoto, Hiroshi; and Iida, Yoshikazu, 4,996,550, Cl. 354-420.000.

Sakamoto, Kiichiro: *See*—
Tokuda, Kanji; Saeki, Yoshihiko; Sakamoto, Kiichiro; and Matsumoto, Fumio, 4,996,558, Cl. 355-50.000.

Sakamoto, Masakatsu: *See*—
Mae, Yutaka; Yaguchi, Yoichi; and Sakamoto, Masakatsu, 4,996,119, Cl. 428-469.000.

Sakamoto, Masanori; Abe, Kunihiro; and Kobayashi, Tomoya, to Fuji Jukogyo Kabushiki Kaisha. Diagnosis system for a motor vehicle. 4,996,643, Cl. 364-424.030.

Sakamoto, Naoki; and Masanori, Itakiyo, to Mita Industrial Co., Ltd. Optical system supporting mechanism for an image processing equipment. 4,996,559, Cl. 355-56.000.

Sakata, Isao; Nakajima, Susumu; Koshimizu, Koichi; Samejima, Natsuki; Inohara, Kazumi; Takata, Hiroyuki; Yamauchi, Hirohiko; Ueda, Nobuo; and Hazue, Masaaki, to Nihon Medi-Physics Co., Ltd.; and Toyo Hakka Kogyo Co., Ltd. Porphyrin derivatives, and their production and use. 4,996,312, Cl. 540-145.000.

Sakoh, Mitsuo: *See*—
Ginnaga, Akihiro; Morokuma, Kazunori; Aihara, Katsutoshi; and Sakoh, Mitsuo, 4,996,299, Cl. 530-409.000.

Sakuma, Hajime: *See*—
Ishimoto, Satomi; Matsushima, Osamu; and Sakuma, Hajime, 4,996,639, Cl. 364-200.000.

Salem, Ronald R.; Thomas, Peter; and Steele, Glenn, to New England Deaconess Hospital Corporation. Marker for colorectal carcinoma and methods of detecting the same. 4,996,298, Cl. 530-395.000.

Salomon S. A.: *See*—
Girault, Eric; and Arnulf, Paul, 4,995,632, Cl. 280-615.000.

Samad, Muhammad A., to VLSI Technology, Inc. Method of generating tests for a combinational logic circuit. 4,996,689, Cl. 371-22.200.

Samejima, Natsuki: *See*—
Sakata, Isao; Nakajima, Susumu; Koshimizu, Koichi; Samejima, Natsuki; Inohara, Kazumi; Takata, Hiroyuki; Yamauchi, Hirohiko; Ueda, Nobuo; and Hazue, Masaaki, 4,996,312, Cl. 540-145.000.

Sampson, Robert; and Flanigan, Sean, to Wasco Products, Inc. Skylight construction. 4,995,208, Cl. 52-200.000.

Samreth, Soth; Bellamy, Francois; and Millet, Jean, to Fournier Innovation et Synergie. Novel beta-d-phenylthioxylosides, their method of preparation and their use as therapeutics. 4,996,347, Cl. 558-411.000.

Samsung Electron Devices Ltd.: *See*—
Kim, Dae-il; and Hwang, Woo-hyun, 4,996,460, Cl. 313-586.000.

SamSung Electronics Co., Ltd.: *See*—
Chang, Eui Y., 4,995,245, Cl. 62-515.000.
Cho, Tae-Young, 4,996,706, Cl. 379-93.000.
Choi, Wan-Kyoon; and Kim, Jong-Whan, 4,995,552, Cl. 228-179.000.
Kim, Moon G., 4,996,672, Cl. 365-225.700.

SamSung Electronics, Ltd.: *See*—
Su, Hyun-Joon, 4,996,466, Cl. 318-6.000.

Sanchez, Richard J.: *See*—
Garrett, Jeffrey L.; Makitka, Harry; Sanchez, Richard J.; and Shepler, Gregory W., 4,995,892, Cl. 65-12.000.

Sanchez, William. Masonry guide. 4,995,167, Cl. 33-404.000.

Sandrock, Gary D.; and Woodard, Winfred L., III, to Ergenics, Inc. Tough and porus getters manufactured by means of hydrogen pulverization. 4,996,002, Cl. 252-181.600.

Sandstrom, Paul H.: *See*—
Wideman, Lawson G.; and Sandstrom, Paul H., 4,996,258, Cl. 524-274.000.
Wideman, Lawson G.; and Sandstrom, Paul H., 4,996,295, Cl. 530-221.000.

Sangyoji, Kazuo; and Kawahara, Hiroshi, to Brother Kogyo Kabushiki Kaisha. Image exposure device for exposing photosensitive recording medium to color image lights. 4,996,552, Cl. 355-1.000.

Sannel, Benjamin H.: *See*—
Lundstrom, Robert W.; Sannel, Benjamin H.; and Warwick, Dennis J., 4,995,501, Cl. 198-341.000.

Sano, Akira; Kamiishi, Hirofumi; and Matsuura, Kazuo, to Nippon Oil Co., Ltd. Production of polyethylene materials having improved strength and modulus qualities. 4,996,011, Cl. 264-28.000.

Sano, Eiichi: *See*—
Anno, Masahiro; and Sano, Eiichi, 4,996,126, Cl. 430-106.600.

Sano, Hiroshi: *See*—
Itoi, Hiroshi; Sano, Hiroshi; and Shibasaki, Kenichiro, 4,996,307, Cl. 536-20.000.

Sano, Koichi: *See*—
Maeda, Akira; Sano, Koichi; Yokoyama, Tetsuo; and Koizumi, Hideaki, 4,996,480, Cl. 324-309.000.

Sano, Tetsuhiro: *See*—
Tajima, Noriyuki; Ueno, Shigeto; and Sano, Tetsuhiro, 4,995,748, Cl. 400-691.000.

Sano, Yoshiaki; Hanazawa, Toshio; and Yoshino, Yoshiro, to Fujitsu Limited; and Fujitsu VLSI Limited. Amplifier circuit having gain control. 4,996,501, Cl. 330-279.000.

SANOFI: *See*—
Mendes, Etienne; Vernieres, Jean-Claude; Simiaud, Jacques; and Keane, Peter E., 4,996,213, Cl. 514-300.000.

Sanraku Incorporated: *See*—
Yoshioka, Takeo; Chida, Noritaka; Watanabe, Azuma; Fukagawa, Yasuo; and Ishikura, Tomoyuki, 4,996,314, Cl. 540-364.000.

Sanshin Kogyo Kabushika Kaisha: *See*—
Imaeda, Hirofumi; and Hakamata, Kyoji, 4,995,370, Cl. 123-583.000.

San Soucie, Marc D.: *See*—
Cooper, James L.; and San Soucie, Marc D., 4,996,662, Cl. 364-900.000.

Santagiuliana, Evans, to Taplast SNC di Evans Santagiuliana & C. Safety cap. 4,995,520, Cl. 215-220.000.

Santen, Sven; and Feinman, Jerome, to SKF Plasma Technologies AB. Method and apparatus for melting iron and steel scrap. 4,996,694, Cl. 373-22.000.

Santo, Toshiyasu, to Toyota Jidosha Kabushiki Kaisha. Strut type suspension. 4,995,633, Cl. 280-673.000.

Sanyo Chemical Industries, Ltd.: *See*—
Takahashi, Hiroshi; Ohta, Atushi; and Akasaki, Sayumi, 4,996,356, Cl. 562-587.000.

Sanyo Electric Co., Ltd.: *See*—
Hirao, Yoshichika; and Hosoya, Nobukazu, 4,996,596, Cl. 358-158.000.
Okamoto, Toshikazu; and Inoue, Fukashi, 4,996,590, Cl. 358-74.000.

Saotome, Yoshimi, to Kabushiki Kaisha Kobe Seiko Sho. Mechanism for suppressing vibrations of travelling crane. 4,995,517, Cl. 212-146.000.

Sarcos Group: *See*—
Jacobsen, Stephen C.; and Wood, John E., 4,995,261, Cl. 73-767.000.

Sarr, Dennis P.: *See*—
Anderson, Patrick L.; Sarr, Dennis P.; and Simpson, Mark B., 4,996,492, Cl. 324-687.000.

Sarraf, Sanwal P., to Eastman Kodak Company. Waveguide scanner. 4,995,689, Cl. 350-96.140.

Sarugaku, Toshio: *See*—
Naito, Hidefumi; Sarugaku, Toshio; and Tokuhara, Masaharu, 4,996,595, Cl. 358-150.000.

Sasa, Hiroyuki: *See*—
Inaba, Makoto; Hayashi, Masaaki; Hashiguchi, Toshihiko; Hibino, Hiroki; Sasa, Hiroyuki; Barlow, David E.; Ohshima, Yutaka; Ishihara, Kohichiro; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Klosterman, Frank; and Goodman, Jack, 4,995,396, Cl. 128-654.000.

Sasaki, Goro, to Sumitomo Electric Industries, Ltd. Method for producing an opto-electronic integrated circuit. 4,996,163, Cl. 437-5.000.

Sasaki, Hidemi: *See*—
Negishi, Kenji; Sasaki, Hidemi; and Fujishiro, Takeshi, 4,996,619, Cl. 360-109.000.

Sasaki, Hirotaka; Tanaka, Aguri; Inagaki, Hiroyuki; Suzuki, Tatsuo; and Asakura, Kenji, to Snow Brand Milk Products Co., Ltd. Needle detacher for syringe. 4,995,871, Cl. 604-110.000.

Sasaki, Kohhei: *See*—
Kitahara, Koichi; Shimada, Takashi; Akita, Noboru; Hiramoto, Tadashi; and Sasaki, Kohhei, 4,996,030, Cl. 423-210.000.

Sasaki, Masaomi; and Aruga, Tomotsu, to Ricoh Company, Ltd. 5-[(4-N,N-ditolylamino)benzyl]-5H-dibenzo[a,d]-cycloheptane derivatives. 4,996,362, Cl. 564-315.000.

Sasaoka, Senzo: *See*—
Suga, Shuzo; Satake, Masaki; and Sasaoka, Senzo, 4,996,130, Cl. 430-264.000.

Sasatani, Tomohiko: *See*—
Kashida, Motokazu; Masui, Toshiyuki; Fukatsu, Tsutomu; Takei, Masahiro; Takahashi, Kouji; and Sasatani, Tomohiko, 4,996,607, Cl. 360-18.000.

Sasayama, Akao: *See*—
Yamauchi, Teruo; and Sasayama, Akao, 4,995,367, Cl. 123-494.000.

Sask, David; Obrejanu, Marcel; and Grimshaw, Allen, to Maralda Oilwell Technology Ltd. Dewaxing control apparatus for oil well. 4,995,462, Cl. 166-304.000.

Satake, Masaki: *See*—
Suga, Shuzo; Satake, Masaki; and Sasaoka, Senzo, 4,996,130, Cl. 430-264.000.

Satin, Harold: *See*—
Seale, Robert; Rizzuto, Dennis; and Satin, Harold, 4,995,840, Cl. 440-66.000.

Sato, Hiroyuki: *See*—
Kobayashi, Takaaki; Tosa, Takahumi; Sato, Hiroyuki; Okada, Hiroyoshi; Miyake, Masao; and Mori, Kenji, 4,996,067, Cl. 426-96.000.

Sato, Izumi: *See*—
Takahashi, Yoshio; Sudo, Mitsuo; Arikawa, Takamasa; Nakamura, Kenji; Sato, Izumi; Onogi, Katsuyuki; Iura, Takao; and Ishida, Nobuji, 4,995,505, Cl. 198-468.400.

Sato, Noriaki: *See*—
Yoshimoto, Masafumi; Nakatsuji, Tadao; and Sato, Noriaki, 4,996,015, Cl. 264-177.110.

Sato, Susumu: *See*—
Ebato, Ken; and Sato, Susumu, 4,995,184, Cl. 40-531.000.

Sato, Takeshi: *See*—
Akano, Hirofumi; Sato, Takeshi; Okumura, Hajime; Kawamura, Yoshiya; and Shimada, Kyo, 4,996,064, Cl. 426-46.000.

Sato, Tomoaki; and Kondo, Munetake, to NKK Corporation. Carriage for inspecting a piping. 4,995,320, Cl. 104-118.000.

Sato, Tsukasa: *See*—
Yamaguchi, Noboru; Nakamura, Hideo; Hagiwara, Yoshimune; Sato, Tsukasa; and Koizumi, Haruo, 4,996,659, Cl. 364-579.000.

Sato, Tsuyoshi: *See*—
Ichinose, Hisao; Takeda, Yoshimitsu; Sato, Tsuyoshi; and Imai, Hiroshi, 4,995,665, Cl. 296-213.000.
Matsuda, Shohei; Suzuki, Jiro; Sato, Tsuyoshi; and Tashima, Kazutoshi, 4,995,677, Cl. 303-113.000.

Sato, Yasuji: *See*—
Takahashi, Toshiaki; and Sato, Yasuji, 4,996,710, Cl. 379-202.000.

Satoh, Atushi: *See*—
Suzuki, Haruo; and Satoh, Atushi, 4,995,302, Cl. 91-369.300.

Satoh, Hiroshi: *See*—
Nakamura, Nobuto; Satoh, Hiroshi; Matsuo; and Esquivel, Misael U., 4,996,236, Cl. 514-659.000.

Satou, Takuma: *See*—
Iwata, Kazuo; Satou, Takuma; and Shibata, Satoru, 4,995,709, Cl. 350-447.000.

Satterfield, Marshall G.: *See*—
Steinke, David M.; Blankenship, Michael; Satterfield, Marshall G.; and Gardner, Philip D., Sr., 4,996,090, Cl. 428-71.000.

Sauder, John A.; and Larson, Harold, to Tandy Corporation. Breakout panel for moldings. 4,995,527, Cl. 220-266.000.

Savoia, Ernest: *See*—
Dyer, Allan E.; and Savoia, Ernest, 4,995,378, Cl. 128-75.000.

Savolainen, Erkki: *See*—
Ljokkoi, Risto; Niiranen, Tapani; Purho, Pekka; Savolainen, Erkki; and Siitonen, Jari, 4,995,991, Cl. 210-797.000.

Savov, Peter H.: *See*—
Lingorski, Nikola A.; Hadjiiski, Mincho B.; Yovchev, Rumen B.; Spassov, Kamen B.; and Savov, Peter H., 4,995,732, Cl. 374-139.000.

Sawada, Kohei: *See*—
Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, 4,996,215, Cl. 514-316.000.

Sawasaki, Tomoo; and Morishige, Chitoshi, to Mazda Motor Corporation. Hydraulic control system for steplessly variable power transmission. 4,995,283, Cl. 74-866.000.

Saxod, Michel: *See*—
Devouassoux, Serge; Marchiset, Michel; and Saxod, Michel, 4,995,621, Cl. 277-37.000.

Say, Quincy, to National Semiconductor Corp. Resistorless electrostatic discharge protection device for high speed integrated circuits. 4,996,626, Cl. 361-91.000.

Sayre, Paul D.: *See*—
Morley, Robert S.; Smith, Roland A.; and Sayre, Paul D., 4,996,684, Cl. 370-100.100.

Scan Coin AB of Jagershillgatan 26, S-213: *See*—
Goh, David, 4,995,848, Cl. 453-3.000.

Scanlon, Robert H.: *See*—
Wang, Chun T.; and Scanlon, Robert H., 4,995,548, Cl. 228-131.000.

Scepter Manufacturing Company Limited: *See*—
Farrell, Grant D.; and Goles, Edward, 4,995,657, Cl. 292-327.000.

Schadlich-Stubenrauch, Jurgen: *See*—
Thomas, Friedrich-Werner; Schadlich-Stubenrauch, Jurgen; and Hediger, Alfred, 4,995,733, Cl. 374-140.000.

Schaedler, Walter: *See*—
Stocker, Rudolf; and Schaedler, Walter, 4,995,264, Cl. 73-702.000.

Schafer, Christopher E. Ticket dispensing structure. 4,995,507, Cl. 206-39.700.

Schafer, Roland: *See*—
Ams, Felix; Baier, Manfred; and Schafer, Roland, 4,995,877, Cl. 606-180.000.

Schaffarzyk, Herbert: *See*—
Probst, Martin; Schaffarzyk, Herbert; and Schaffarzyk, Walter, 4,995,760, Cl. 404-119.000.

Schaffarzyk, Walter: *See*—
Probst, Martin; Schaffarzyk, Herbert; and Schaffarzyk, Walter, 4,995,760, Cl. 404-119.000.

Schaffer, Michael; and Teudt, Gerald J. Apparatus for suppressing automobile anti-theft arm/disarm system. 4,996,515, Cl. 340-426.000.

Schall, Harold B.: *See*—
Anafi, David; Mitchell, John H.; and Schall, Harold B., 4,996,412, Cl. 250-201.900.

Schaller, Gotthilf: *See*—
Kuhbauch, Gerd; and Schaller, Gotthilf, 4,995,135, Cl. 15-250.210.

Schantz, Spencer; Janz, Ronald J.; Christiansen, Gary; and Sager, Steven, to U.S. Controls Corp. Bimetal operated lid switch and lock for appliances. 4,995,650, Cl. 292-201.000.

Schappler, Joseph J.; Glogan, David J.; and Burnham, William L., to Eastman Kodak Company. Camera with flip-up flash unit. 4,996,548, Cl. 354-149.110.

Scheidmeir, Walter: *See*—
Bott, Kaspar; Hoffmann, Herwig; Scheidmeir, Walter; and Trapp, Horst, 4,996,324, Cl. 546-339.000.

Schellhaass, Karl: *See*—
Love, Graham; Schellhaass, Karl; Rathjen, Barbel; and Schwarz, Jurgen, 4,996,066, Cl. 426-77.000.

Schering AG: *See*—
Bolze, Manfred; and Drawert, Manfred, 4,996,290, Cl. 528-272.000.

Schering Corporation: *See*—
Berger, Joel G.; Chang, Wei K.; Gold, Elijah H.; and Elliott, Arthur J., 4,996,202, Cl. 514-213.000.
Duelfer, Timothy; and Blythin, David J., 4,996,212, Cl. 514-293.000.

Scherowsky, Gunter; and Schreiber, Peter, to Hoechst Aktiengesellschaft. Chiral substituted tartarimides. 4,996,330, Cl. 548-544.000.

Scheuneman, James H.: *See*—
Byers, Larry L.; Tsang, Kay; Scheuneman, James H.; and Svenkeson, Penny, 4,996,688, Cl. 371-16.500.

Schick, Jean-Francois, to GORO S.A. Stapling apparatus for fixing junction staples on the end of a conveyor belt or the like. 4,995,542, Cl. 227-112.000.

Schieferly, Stephen B., to AMP Incorporated. Connector having an improved slide latch and a slide latch member therefor. 4,995,826, Cl. 439-347.000.

Schiffrin, David J.: *See*—
Wiles, Martin C.; Schiffrin, David J.; and Clarke, David J., 4,995,960, Cl. 204-418.000.

Schildknecht, Eugene G.; and Untawale, Govind G., to Hoffmann-La Roche Inc. Anticoccidial composition. 4,996,198, Cl. 514-157.000.

Schill, Jurgen; Heene, Hans F.; Stahl, Rainer; and Weber, Friedrich, to Klein, Schanzlin & Becker Aktiengesellschaft. Vertical barrel pump. 4,995,790, Cl. 417-360.000.

Schilling, Peter, to Westvaco Corporation. Cationic slurry seal emulsifiers. 4,995,909, Cl. 106-277.000.

Schirmann, Jean-Pierre: *See*—
Pralus, Christian; and Schirmann, Jean-Pierre, 4,996,039, Cl. 423-584.000.

Schlemmer, Lothar: *See*—
Koehler, Gernot; Schmidt-Thuemmes, Juergen; Hasenbein, Norbert; Schlemmer, Lothar; and Dietsche, Wolfram, 4,996,259, Cl. 524-276.000.

Schlumberger Industries: *See*—
Rebjock, Alain, 4,996,411, Cl. 235-488.000.

Schmid, Karlheinz, to Gebr. Heller Maschinenfabrik GmbH. Apparatus for machining axially symmetrical workpiece surfaces. 4,995,160, Cl. 29-568.000.

Schmidt, Albert L.: *See*—
Sherwin, Gary W.; Kovach, Edward E.; and Schmidt, Albert L., 4,995,392, Cl. 128-639.000.

Schmidt, Anton: *See*—
Moller, Rainer; Pretscher, Manfred; and Schmidt, Anton, 4,995,737, Cl. 384-607.000.

Schmidt, Hans, to Siemens Aktiengesellschaft. Printed circuit board having an injection molded substrate. 4,996,391, Cl. 174-255.000.

Schmidt, Rudi: *See*—
Kuhn, Max; and Schmidt, Rudi, 4,996,397, Cl. 200-144.00B.

Schmidt, Theo: *See*—
Merz, Winfried; and Schmidt, Theo, 4,995,930, Cl. 156-209.000.

Schmidt-Thuemmes, Juergen: *See*—
Koehler, Gernot; Schmidt-Thuemmes, Juergen; Hasenbein, Norbert; Schlemmer, Lothar; and Dietsche, Wolfram, 4,996,259, Cl. 524-276.000.

Schneider, Claus: *See*—
Weber, Karl-Heinz; Walther, Gerhard; Schneider, Claus; Hinzen, Dieter; Kuhn, Franz J.; and Lehr, Erich, 4,996,224, Cl. 514-424.000.

Schneider, Joachim: *See*—
Haase, Henry; Schneider, Joachim; and Alber, Pierre, 4,995,736, Cl. 384-448.000.

Schneyderberg Van Der Zon, Ingrid A. C., to U.S. Philips Corporation. Vehicle navigation device with reproduction of a selected map element according to a predetermined representation standard. 4,996,645, Cl. 364-449.000.

Schoeff, Nadine; and Poujol, Jean-Pierre, deceased (by Poujol, Raymonde), to Schoeff, Nadine. Composition for locally treating the epidermis, especially the scalp. 4,996,057, Cl. 424-451.000.

Schoenberg, Jules E., to National Starch and Chemical Investment Holding Corporation. Carbinol-containing polyimide oligomers terminated with epoxide-reactive groups. 4,996,268, Cl. 525-434.000.

Scholz, Herbert; Zeidler, Adolf; Wuerzer, Bruno; and Meyer, Norbert, to BASF Aktiengesellschaft. Optically active diazabicycloalkane derivatives and their use for protecting crops from the phytotoxic effect of herbicides. 4,995,899, Cl. 71-92.000.

Scholz, James P.: *See*—
Ayer, Kenneth N.; and Scholz, James P., 4,995,838, Cl. 439-874.000.

Schormair, Eckart: *See*—
Hinrichs, Michael; Homolla, Jurgen; Schormair, Eckart; Czempik, Klaus; and Hornig, Rolf, 4,995,342, Cl. 119-18.000.

Schramm, Charles M.; Lane, Robert H.; and Dines, Martin B., deceased (by Dines, Elaine, legal representative), to Occidental Research Corporation. Method of making inorganically crosslinked layered compounds. 4,995,897, Cl. 71-64.110.

Schreiber, Peter: *See*—
Scherowsky, Gunter; and Schreiber, Peter, 4,996,330, Cl. 548-544.000.

Schroeder, Robert, to Pacific Bearing Co. Pillow block housing for a shaft-supporting bearing. 4,995,734, Cl. 384-38.000.

Schroepfer, Richard C.: *See*—
Korsunsky, Iosif; Schroepfer, Richard C.; and Leidy, James A., 4,995,825, Cl. 439-328.000.

Schryver, Jeff: *See*—
Demane, Michael; Fallin, Thomas W.; Garner, Steve; and Schryver, Jeff, 4,995,883, Cl. 623-23.000.

Schubert, W. Peter; and Wilke, Thomas A., to Paradygm Science & Technologies, Inc. Process for brazing a metal object to a ceramic

surface defining a hole for receiving the metal object. 4,995,547, Cl. 228-124.000.

Schultz, Herbert V.: *See*—
Meer, E. Harvey; Mountain, Frank; and Schultz, Herbert V., 4,996,051, Cl. 424-195.100.

Schultz, Michael: *See*—
Tsaklakidis, Christos; Bosies, Elmar; Schultz, Michael; Haag, Rainer; Herrmann, Dieter; and Pahlke, Wulf, 4,996,219, Cl. 514-341.000.

Schultze, Eckart F.; Easter, Richard; and Funderburk, Robert V., to Yale Security Inc. Power-assist door closer. 4,995,194, Cl. 49-32.000.

Schumacher, Hans: *See*—
Turck, Werner; and Schumacher, Hans, 4,996,408, Cl. 219-130.010.

Schumacher, Larry L. Controllable inertia flywheel. 4,995,282, Cl. 74-572.000.

Schurmann, Erich, to Gabel BmbH. Sun roof. 4,995,666, Cl. 296-216.000.

Schutte, Karl-Heinz: *See*—
Groos, Horst; and Schutte, Karl-Heinz, 4,995,253, Cl. 72-257.000.

Schwarz, Jurgen: *See*—
Love, Graham; Schellhaass, Karl; Rathjen, Barbel; and Schwarz, Jurgen, 4,996,066, Cl. 426-77.000.

Schwarzler, Peter; Wormsbacher, Hans; and Beier, Rudolf, to Lohr & Bromkamp GmbH. Plunging constant velocity ratio universal joint. 4,995,853, Cl. 464-144.000.

Schweitzer, Edmund O., III, to Schweitzer Engineering Laboratories, Inc. Fault location method for radial transmission and distribution systems. 4,996,624, Cl. 361-63.000.

Schweitzer Engineering Laboratories, Inc.: *See*—
Schweitzer, Edmund O., III, 4,996,624, Cl. 361-63.000.

Schwerdtfeger & Kubicek Systemtechnik GmbH & Co. KG: *See*—
Reumann, Manfred; Preiss, Wolfgang; and Kubicek, Andreas, 4,995,251, Cl. 72-132.000.

Science Research Laboratory, Inc.: *See*—
Birx, Daniel L., 4,996,495, Cl. 328-65.000.

Scott, Bentley N.; and Yang, Y. Sam, to Atlantic Richfield Company. Microwave apparatus and method for measuring fluid mixtures. 4,996,490, Cl. 324-639.000.

Scott, Charles D.; Woodward, Charlene A.; and Byers, Charles H., to United States of America, Energy. Gel bead composition for metal adsorption. 4,995,985, Cl. 210-679.000.

Seabury, Thomas: *See*—
Potter, Thomas; and Seabury, Thomas, 4,996,716, Cl. 455-41.000.

Seagate Technology, Inc.: *See*—
Yaeger, John R.; and Wilkins, Suzanne R., 4,996,617, Cl. 360-105.000.

Seale, Robert; Rizzuto, Dennis; and Satin, Harold, to Hydrofoil International, Inc. Stabilizing fin for a motor boat. 4,995,840, Cl. 440-66.000.

Searle, John G., to Allwood, Searle & Timney (Holdings) Limited. Friction welding apparatus. 4,995,544, Cl. 228-2.000.

Season-All Industries, Inc.: *See*—
Bezubic, William P., 4,995,213, Cl. 52-656.000.

Seattle Silicon Corporation: *See*—
Byrkett, Bruce E., 4,996,512, Cl. 338-306.000.

SEB S.A.: *See*—
Leiros, Ernest, 4,995,312, Cl. 99-411.000.
Louison, Bernard; and Burton, Camille, 4,995,177, Cl. 38-88.000.

Secourgeon, Liliane: *See*—
Moussavi, Mehdi; and Secourgeon, Liliane, 4,996,311, Cl. 540-139.000.

Sedgeley, William A.; and Moore, Ronald L., to Adolph Coors Company. Apparatus and method for debagging articles. 4,995,771, Cl. 414-412.000.

Segal, Arthur R., to North American Products, Corp. Face milling cutter with indexable inserts. 4,995,767, Cl. 407-41.000.

Segelken, John M.: *See*—
Pimpinella, Richard J.; Segelken, John M.; Tai, King L.; and Thompson, Ross J., 4,995,695, Cl. 350-96.200.

Segerljung, Max. Wheel assembly for moving objects. 4,995,679, Cl. 301-5.00R.

Seid, Bernhard: *See*—
Berbner, Heinz; Ebel, Klaus; Kuczaty, Michael; Seid, Bernhard; Woerner, Frank P.; and Zettler, Hans D., 4,996,289, Cl. 528-230.000.

Seiden, Paul; and White, Robert L., to Procter & Gamble Company, The. Tailored beta-prime stable triglyceride hardstock. 4,996,074, Cl. 426-601.000.

Seidinger, Gottfried, to Maschinenfabrik Andritz Actiengesellschaft. Set of guide rolls for guiding, positioning and controlling motion of bands of material fed through the rolls. 4,995,541, Cl. 226-174.000.

Seiko Epson Corporation: *See*—
Aruga, Shuji, 4,995,702, Cl. 350-331.00R.

Seiter, Harry: *See*—
Muller, Dietmar; Bauer, Helmut; Franken, Harald; and Seiter, Harry, 4,995,802, Cl. 425-154.000.

Seitoh, Shinichi: *See*—
Kawai, Tatsundo; Ogura, Makoto; Tomoda, Koji; Ichihashi, Hiroo; Seitoh, Shinichi; Kuroda, Yasuo; and Noguchi, Hiroyuki, 4,996,606, Cl. 358-475.000.

Seitz, Reiner, to ROWO Rohr und Kanal Reiningungsgeraete GmbH. Guiding device for spiral pipe cleaners. 4,995,132, Cl. 15-104.330.

Sekera, Robert S.: *See*—
Howell, David A.; Hydeman, Jeffrey E.; Slater, Jeffrey L.; Bodnar, Richard J.; Golick, Leonard R.; Sekera, Robert S.; and Roth, Charles H., Jr., 4,995,158, Cl. 29-723.000.

Sekikawa, Ayako; Sugi, Hideo; and Takahashi, Ryoichi, to Kurita Water Industries Ltd. Method of producing a clathrate compound. 4,996,220, Cl. 514-372.000.

Sekine, Tomoyuki: *See*—
Shindo, Norikazu; Sekine, Tomoyuki; Nakamura, Yoshikatsu; and Kawamoto, Takashi, 4,996,022, Cl. 419-2.000.

Sekisui Kagaku Kogyo Kabushiki Kaisha: *See*—
Nakachi, Takeshi; Hata, Akio; and Watanabe, Yoshihisa, 4,996,272, Cl. 526-62.000.

Sema, Yoshihito: *See*—
Nakada, Toshio; Takemura, Fumio; Sema, Yoshihito; and Kataoka, Kazuhito, 4,995,999, Cl. 252-62.550.

Semasa, Takayoshi: *See*—
Ono, Fumitaka; and Semasa, Takayoshi, 4,996,602, Cl. 358-457.000.

Semiconductor Energy Laboratory Co., Ltd.: *See*—
Inujima, Takashi; Yamazaki, Shunpei; Konuma, Toshimitsu; Hamatani, Toshiji; Sakama, Mitsunori; Yamaguchi, Toshiharu; and Kobayashi, Ippei, 4,995,706, Cl. 350-350.00S.
Itoh, Kenji, 4,996,079, Cl. 427-39.000.

Semion, Robert: *See*—
Weaver, Robert C.; and Semion, Robert, 4,995,663, Cl. 296-100.000.

Sequioa Controls Company, Ltd.: *See*—
Adishian, David; and Silverman, Ira J., 4,995,589, Cl. 251-335.300.

Sevennec, Yvon: *See*—
Bertin, Patrice; and Sevennec, Yvon, 4,995,488, Cl. 192-1.100.

Sewell, Charles A.; and Toles, Robert D., to Dow Chemical Company, The. Cleaning gas turbine fuel nozzles. 4,995,915, Cl. 134-22.140.

SGS-Thomson Microelectronics srl: *See*—
Chiriatti, Antonio; and Masini, Marco, 4,996,451, Cl. 307-468.000.

Shanks, Ian A., to Thorn EMI plc. Method of and an apparatus for projecting a scanned two- or three-dimensional modulated light pattern originating from a light source. 4,995,719, Cl. 353-122.000.

Sharon Manufacturing Company: *See*—
Hudson, Sharon J., Jr., 4,995,346, Cl. 123-41.350.

Sharp, Bruce R. Ribbed storage tank systems with interior wall sections for enhanced strength. 4,995,528, Cl. 220-445.000.

Sharp, Donald J.; Vernon, Milton E.; and Wright, Steven A., to United States of America, Energy. Process for forming a metal compound coating on a substrate. 4,995,947, Cl. 204-1.500.

Sharp Kabushiki Kaisha: *See*—
Akita, Kenji; and Aiga, Junji, 4,995,806, Cl. 431-30.000.
Morita, Toshiya; Kita, Sumio; and Kamada, Hiroshi, 4,996,652, Cl. 364-521.000.
Sunano, Hironori, 4,996,522, Cl. 340-700.000.
Tagawa, Takao, 4,996,392, Cl. 178-18.000.

Sharpe, Henry D., III: *See*—
Beckman, Ralph A.; Sharpe, Henry D., III; Curado, Len; and Barfoot, James W., 4,995,403, Cl. 128-776.000.

Shaw, Donald F.: *See*—
Danielsen, Arvid M.; and Shaw, Donald F., 4,996,028, Cl. 422-147.000.

Shaw, John G.: *See*—
Hack, Michael; Shaw, John G.; and Shur, Michael, 4,996,573, Cl. 357-23.700.

Shawl, Edward T.: *See*—
Kesling, Haven S., Jr.; Shawl, Edward T.; and Zajacek, John G., 4,996,359, Cl. 564-50.000.

Shaye Communications Limited: *See*—
McCabe, David J., 4,996,696, Cl. 375-30.000.

Shearer, Mahlon W.: *See*—
Olberding, Gordon D.; and Shearer, Mahlon W., 4,995,195, Cl. 49-118.000.

Sheet Metal Industries, Inc.: *See*—
Pink, William B.; and Ickes, William G., 4,995,808, Cl. 432-72.000.

Sheffield, Peter: *See*—
Brisbin, Brian; McCaffrey, Felim; and Sheffield, Peter, 4,995,203, Cl. 52-6.000.

Shelekhov, Konstantin V.: *See*—
Paton, Boris E.; Vasiliev, Vsevolod V.; Bogdanovsky, Valentin A.; Shelekhov, Konstantin V.; Gavva, Viktor M.; Bigdash, Vladimir D.; Tabunschik, Ivan A.; and Ilchishin, Andrei P., 4,996,409, Cl. 219-130.010.

Shell Oil Company: *See*—
Chao, Kuo-Hua; Dutta, Tamal K.; and Slaugh, Lynn H., 4,996,007, Cl. 260-410.90R.
Dewhirst, Kenneth C., 4,996,279, Cl. 528-27.000.
Gerlowski, Leonard E.; Kastelic, John R.; and Korcz, William H., 4,996,086, Cl. 427-421.000.
Hamilton, David M., Jr.; and Kemp, Richard A., 4,996,386, Cl. 585-646.000.
Van Der Huizen, Adriaan A., 4,996,273, Cl. 526-177.000.

Shepler, Gregory W.: *See*—
Garrett, Jeffrey L.; Makitka, Harry; Sanchez, Richard J.; and Shepler, Gregory W., 4,995,892, Cl. 65-12.000.

Sheppard, Ian J.: *See*—
Hazelden, Roger J.; Sheppard, Ian J.; and Taft, Philip A., 4,995,480, Cl. 188-1.110.

Sher, Cheng-Hsien. Structure of garbage can assembly. 4,995,529, Cl. 220-475.000.

Sherman Industries: *See*—
Smith, Charles R., 4,995,136, Cl. 15-312.100.

Sherman, Wayne: *See*—
Ballenger, William; Sherman, Wayne; and Suter, Michael, 4,995,973, Cl. 210-209.000.

Sherwin, Gary W.; Kovach, Edward E.; and Schmidt, Albert L., to Westinghouse Electric Corp. Self-preparing electrode with removable plastic abrading brush. 4,995,392, Cl. 128-639.000.
Sheu, Shen S.: *See*—
Hector, Louis G.; and Sheu, Shen S., 4,996,113, Cl. 428-600.000.
Shibaoka, Hideo. Document processing apparatus with automatic hyphenation during editing. 4,995,738, Cl. 400-7.000.
Shibasaki, Kenichiro: *See*—
Itoi, Hiroshi; Sano, Hiroshi; and Shibasaki, Kenichiro, 4,996,307, Cl. 536-20.000.
Shibata, Satoru: *See*—
Iwata, Kazuo; Satou, Takuma; and Shibata, Satoru, 4,995,709, Cl. 350-447.000.
Shibata, Youichi: *See*—
Yamashita, Tsuyoshi; Kobayashi, Goro; Nakamura, Hisanori; Shibata, Youichi; and Mori, Toshihiro, 4,996,683, Cl. 370-4.000.
Shibuya, Hiromi: *See*—
Goldowsky, Michael P.; Hisano, Teiji; Karidis, John P.; Shibuya, Hiromi; and Ueda, Osamu, 4,995,744, Cl. 400-157.200.
Shida, Masami: *See*—
Manaka, Toshio; and Shida, Masami, 4,995,366, Cl. 123-492.000.
Shida, Tomohiko: *See*—
Kajiwara, Ryoichi; Funamoto, Takao; Kato, Mituo; Wachi, Hiroshi; and Shida, Tomohiko, 4,996,589, Cl. 357-82.000.
Shieh, Chiung-Huei; Funt, John M.; and Ouyang, George B. Method of abrading. 4,995,197, Cl. 51-281.00R.
Shigeru, Keijiro: *See*—
Takagi, Shigehide; Yano, Hideo; Oku, Takashi; Shigeru, Keijiro; Kuboto, Yoshifumi; and Shishikura, Tsutomu, 4,996,177, Cl. 501-153.000.
Shigyo, Masatomo, to Mazda Motor Corporation. Gas vent system of a mold. 4,995,445, Cl. 164-305.000.
Shih, Chuan: *See*—
Taylor, Edward C.; Kuhnt, Dietmar G.; Shih, Chuan; and Grindey, Gerald B., 4,996,206, Cl. 514-258.000.
Shikamori, Tamotu: *See*—
Ishino, Takashi; Hiyama, Isao; Nagano, Yousuke; Shikamori, Tamotu; Turuta, Shizuo; Kamano, Toshiyasu; and Ohsugi, Hiroshi, 4,995,247, Cl. 68-12.00R.
Shikoku Kakoki Co., Ltd.: *See*—
Wakabayashi, Shigeru; Saijo, Yoshihiro; Yamane, Yoshitaka; and Fujikawa, Yasuji, 4,995,431, Cl. 141-116.000.
Shimada, Kyo: *See*—
Akano, Hirofumi; Sato, Takeshi; Okumura, Hajime; Kawamura, Yoshiya; and Shimada, Kyo, 4,996,064, Cl. 426-46.000.
Shimada, Takashi: *See*—
Kitahara, Koichi; Shimada, Takashi; Akita, Noboru; Hiramoto, Tadashi; and Sasaki, Kohhei, 4,996,030, Cl. 423-210.000.
Shimizu Construction Co., Ltd.: *See*—
Tokuhiro, Tomoya; Koibuchi, Nobutaka; Miyauchi, Teruhiko; Kikuchi, Koshin; Hirokawa, Jun; Yamashiro, Kunio; Nishizuka, Sakae; Watanabe, Ippei; Maruo, Shozo; Tsutsui, Yohichiro; and Ishikawa, Sadahito, 4,995,765, Cl. 406-117.000.
Shimomura, Hiroyoshi: *See*—
Hasegawa, Yukinobu; Shimomura, Hiroyoshi; Murai, Koichi; Maruyama, Masatoshi; and Tange, Toyokichi, 4,996,127, Cl. 430-109.000.
Shimoyashiki, Shigehiro; and Kawabe, Ryuhei, to Hitachi, Ltd. A system for restraining diffusion of tritium. 4,996,020, Cl. 376-313.000.
Shin-Etsu Chemical Co., Ltd.: *See*—
Inomata, Hiroshi; Kishita, Hirofumi; and Yoshida, Akira, 4,996,344, Cl. 556-448.000.
Shindo, Norikazu; Sekine, Tomoyuki; Nakamura, Yoshikatsu; and Kawamoto, Takashi, to Juki Corporation; and Nippon Piston Ring Co., Ltd. Process for producing a sintered body. 4,996,022, Cl. 419-2.000.
Shiner, James A. Technique for locating submerged and buried pipelines. 4,995,168, Cl. 33-529.000.
Shinitzky, Meir: *See*—
Cohen, Irun R.; and Shinitzky, Meir, 4,996,194, Cl. 514-21.000.
Shinmeiwa Industry Co., Ltd.: *See*—
Tokuhiro, Tomoya; Koibuchi, Nobutaka; Miyauchi, Teruhiko; Kikuchi, Koshin; Hirokawa, Jun; Yamashiro, Kunio; Nishizuka, Sakae; Watanabe, Ippei; Maruo, Shozo; Tsutsui, Yohichiro; and Ishikawa, Sadahito, 4,995,765, Cl. 406-117.000.
Shinomiya, Kohji, to Mitsubishi Denki Kabushiki Kaisha. Color filter device. 4,996,417, Cl. 250-226.000.
Shinto, Hiroaki; Sakaguchi, Sumio; and Asagiri, Katuki, to Toyota Jidosha Kabushiki Kaisha; and Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho. Air bag cover. 4,995,638, Cl. 280-731.000.
Shiokawa, Takeji: *See*—
Imai, Kuninori; Shiokawa, Takeji; Kato, Shigeo; Ishikawa, Isao; Ikeda, Toshimichi; and Otake, Kan, 4,995,711, Cl. 350-529.000.
Shiomi, Yasufumi, to Matsushita Electric Industrial Co., Ltd. Frequency converter circuit. 4,996,718, Cl. 455-323.000.
Shippers Paper Products Company: *See*—
Liebel, Henry L., 4,995,512, Cl. 206-396.000.
Shirai, Masanari: *See*—
Ohashi, Masashi; Toyama, Yoshikuni; Kagiura, Kazuo; Maruyama, Hiroyoshi; Shiratori, Tatsuya; Shirai, Masanari; and Ando, Eiichi, 4,995,601, Cl. 271-127.000.
Shirai, Noboru; and Isogai, Toshiyuki, to Kabushiki Kaisha Tokai Rika Denki Seisakusho. Wheel cover. 4,995,674, Cl. 301-37.00P.
Shiraishi, Shuji; Nishihara, Takashi; Kiryu, Hironobu; and Omomo, Naoki, to Honda Giken Kogyo K.K. Steering angle detecting system for automotive vehicles. 4,996,657, Cl. 364-559.000.
Shiraki, Manabu; and Hamaguchi, Osamu, to Sicoh Engineering Co., Ltd. Door locking devices. 4,995,658, Cl. 292-336.300.
Shirasaki, Masahiro, to Fujitsu Limited. MIS transistor structure for increasing conductance between source and drain regions. 4,996,574, Cl. 357-23.700.
Shirasugi, Kouji, to Ricoh Company, Ltd. Controllable drive of optics of a copier. 4,996,564, Cl. 355-235.000.
Shiratori, Tatsuya: *See*—
Ohashi, Masashi; Toyama, Yoshikuni; Kagiura, Kazuo; Maruyama, Hiroyoshi; Shiratori, Tatsuya; Shirai, Masanari; and Ando, Eiichi, 4,995,601, Cl. 271-127.000.
Shiring, Francis J., III: *See*—
Cullo, Leonard A.; and Shiring, Francis J., III, 4,996,385, Cl. 585-640.000.
Shirota, Riichiro: *See*—
Endoh, Tetsuo; Shirota, Riichiro; Momodomi, Masaki; Tanaka, Tomoharu; Masuoka, Fujio; and Watanabe, Shigeyoshi, 4,996,669, Cl. 365-185.000.
Shishikura, Tsutomu: *See*—
Takagi, Shigehide; Yano, Hideo; Oku, Takashi; Shigeru, Keijiro; Kuboto, Yoshifumi; and Shishikura, Tsutomu, 4,996,177, Cl. 501-153.000.
Shoji, Hisashi: *See*—
Morita, Shizuo; Matsuo, Shunji; Haneda, Satoshi; Fukuchi, Masakazu; and Shoji, Hisashi, 4,996,566, Cl. 355-246.000.
Shoji, Tadao: *See*—
Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, 4,996,215, Cl. 514-316.000.
Shook, William B., to Thurston, Inc. Saddle support for bicycles, motorcycles, and the like. 4,995,753, Cl. 403-24.000.
Shorr, Leonard M.: *See*—
Fishler, Theodor-Morel; Peled, Michael; and Shorr, Leonard M., 4,996,276, Cl. 526-2927.500.
Shukuri, Kyoichi: *See*—
Takatsuki, Nobuyuki; and Shukuri, Kyoichi, 4,996,622, Cl. 360-135.000.
Shur, Michael: *See*—
Hack, Michael; Shaw, John G.; and Shur, Michael, 4,996,573, Cl. 357-23.700.
Shutoku, Ryuji: *See*—
Takahashi, Kaoru; Tsumiji, Akio; and Shutoku, Ryuji, 4,996,518, Cl. 340-518.000.
Sick, August J.; and Gilroy, Thomas E., to Mycogen Corporation. Bacillus thuringiensis gene encoding a coleopteran-active toxin. 4,996,155, Cl. 435-252.300.
Sicoh Engineering Co., Ltd.: *See*—
Shiraki, Manabu; and Hamaguchi, Osamu, 4,995,658, Cl. 292-336.300.
Siegel, Jodie M.; Sternlieb, Herschel; Connolly, Timothy J.; Greenway, J. Michael; Parker, D. A.; and Simon, Arlene T., to International Paper Company. Apparatus and method for hydropatterning fabric. 4,995,151, Cl. 26-69.00R.
Siemens Aktiengesellschaft: *See*—
Finzel, Lothar, 4,995,728, Cl. 350-96.210.
Frank, Richard; and Hofmann, Fritz-Walter, 4,996,414, Cl. 250-213.0VT.
Hoenig, Eckhardt, 4,996,479, Cl. 324-248.000.
Huber, Jakob; and Meier, Wolfgang, 4,996,504, Cl. 333-81.00R.
Keller, Walter, 4,996,435, Cl. 250-551.000.
Krummel, Peter, 4,996,462, Cl. 315-209.00R.
Lischke, Burkard, 4,996,441, Cl. 250-492.200.
Schmidt, Hans, 4,996,391, Cl. 174-255.000.
Siemens-Bendix Automotive Electronics Limited: *See*—
Cook, John E., 4,995,369, Cl. 123-520.000.
Sievers, G. Kelly. Repair composition and method. 4,996,085, Cl. 427-140.000.
Signet Systems, Inc.: *See*—
Bartlett, Matthew T., 4,995,453, Cl. 165-150.000.
Signode Corporation: *See*—
Kato, Kanami, 4,995,776, Cl. 410-100.000.
Siitonen, Jari: *See*—
Ljokkoi, Risto; Niiranen, Tapani; Purho, Pekka; Savolainen, Erkki; and Siitonen, Jari, 4,995,991, Cl. 210-797.000.
Silva, Robert F.: *See*—
Carter, Jeanne K.; and Silva, Robert F., 4,996,152, Cl. 435-172.300.
Silver, Spencer F.: *See*—
Bronn, William R.; Silver, Spencer F.; and Joseph, Eugene G., 4,996,266, Cl. 525-271.000.
Silverman, Ira J.: *See*—
Adishian, David; and Silverman, Ira J., 4,995,589, Cl. 251-335.300.
Simiaud, Jacques: *See*—
Mendes, Etienne; Vernieres, Jean-Claude; Simiaud, Jacques; and Keane, Peter E., 4,996,213, Cl. 514-300.000.
Simon, Arlene T.: *See*—
Siegel, Jodie M.; Sternlieb, Herschel; Connolly, Timothy J.; Greenway, J. Michael; Parker, D. A.; and Simon, Arlene T., 4,995,151, Cl. 26-69.00R.
Simon Fraser University: *See*—
Divigalpitiya, W. M. Ranjith; Frindt, Robert F.; and Morrison, S. Roy, 4,996,108, Cl. 428-411.100.
Simon, Mark A.: *See*—
Smith, Richard D.; Knowles, Steve; Cassady, R. J.; Smith, William; and Simon, Mark A., 4,995,231, Cl. 60-203.100.

Simpson, Andrew F.: *See*—
Jenkins, Michael S.; Simpson, Andrew F.; and Porter, David A., 4,995,893, Cl. 65-18.200.
Simpson, Mark B.: *See*—
Anderson, Patrick L.; Sarr, Dennis P.; and Simpson, Mark B., 4,996,492, Cl. 324-687.000.
Simpson Strong-Tie Company, Inc.: *See*—
Colonias, Karen W.; Commins, Alfred D.; Gilb, Tyrell T.; Lin, Jin-Jie; and Moore, Richard D., 4,995,206, Cl. 52-297.000.
Sinclair, Paul L., to Halliburton Logging Services, Inc. Laboratory technique for measuring complex dielectric constant of rock core samples. 4,996,489, Cl. 324-639.000.
Singe, Thomas: *See*—
Behdorf, Hans; Singe, Thomas; and Sollner, Gerhardt, 4,996,095, Cl. 428-215.000.
Singer, Haimi N., deceased (by Singer, Tamara, executor), to Singer & Hersch Industrial Development. Lubricant. 4,995,994, Cl. 252-28.000.
Singer & Hersch Industrial Development: *See*—
Singer, Haimi N., deceased, 4,995,994, Cl. 252-28.000.
Singer, Tamara, executor: *See*—
Singer, Haimi N., deceased, 4,995,994, Cl. 252-28.000.
Singh, Sheo B.: *See*—
Pettit, George R.; and Singh, Sheo B., 4,996,237, Cl. 514-720.000.
Sinh, Nguyen X.: *See*—
Yee, Loren; and Sinh, Nguyen X., 4,996,452, Cl. 307-475.000.
Sinnreich, Joel, to Ciba-Geigy Corporation. Covered retard forms. 4,996,058, Cl. 424-462.000.
Sircar, Jagadish C.: *See*—
Malone, Thomas C.; and Sircar, Jagadish C., 4,996,319, Cl. 544-330.000.
Skeels, Gary W., to UOP. Process for preparing silicon substituted zeolite compositions. 4,996,034, Cl. 423-328.000.
Skerker, Robert B.; and Prindle, William, to Robinson Knife Manufacturing Co., Inc. Cooking apparatus for roasting food. 4,996,404, Cl. 219-10.55E.
SKF Industrial Trading and Development Company B.V.: *See*—
van der Drift, Ernst; and Kapaan, Hendrikus J., 4,995,850, Cl. 464-143.000.
SKF Plasma Technologies AB: *See*—
Santen, Sven; and Feinman, Jerome, 4,996,694, Cl. 373-22.000.
Skiff, Ronald H.: *See*—
O'Brien, Michael J.; Spence, Jean E.; Skiff, Ronald H.; Vogel, Gerald J.; and Prasad, Ravi, 4,996,317, Cl. 544-274.000.
Skis Rossignol S. A.: *See*—
Piegay, Yves, 4,995,630, Cl. 280-602.000.
Skuinsh, Leon M.: *See*—
Abrosimov, Vladimir A.; Luzev, Viktor F.; Lyapunov, Vladimir N.; Kuznetsov, Jury N.; Manerov, Vladimir B.; and Skuinsh, Leon M., 4,995,730, Cl. 366-273.000.
Slater, Jeffrey L.: *See*—
Howell, David A.; Hydeman, Jeffrey E.; Slater, Jeffrey L.; Bodnar, Richard J.; Golick, Leonard R.; Sekera, Robert S.; and Roth, Charles H., Jr., 4,995,158, Cl. 29-723.000.
Slaugh, Lynn H.: *See*—
Chao, Kuo-Hua; Dutta, Tamal K.; and Slaugh, Lynn H., 4,996,007, Cl. 260-410.90R.
Slodki, Morey E.: *See*—
Cadmus, Martin C.; and Slodki, Morey E., 4,996,153, Cl. 435-209.000.
Slongo, Mario: *See*—
Leppard, David G.; Slongo, Mario; and Rody, Jean, 4,996,326, Cl. 548-261.000.
Smayling, Michael C.: *See*—
Paterson, James L.; and Smayling, Michael C., 4,996,668, Cl. 365-185.000.
Smeltz, Kenneth C.: *See*—
Putzig, Donald E.; and Smeltz, Kenneth C., 4,996,336, Cl. 556-55.000.
Smetana, Bruce A.: *See*—
Critchlow, David N.; Avis, Graham M.; Earlam, Sandra J. K.; Johnson, Karle J.; Smetana, Bruce A.; Westling, Gregory L.; Paneth, Eric; and Yehushua, Moshe, 4,996,697, Cl. 375-104.000.
Smith, Alan L.: *See*—
Bonacorsi, Dennis L.; McGeachy, Donald E.; and Smith, Alan L., 4,995,421, Cl. 137-383.000.
Smith, Bradley W.: *See*—
Lynch, Ronald E.; and Smith, Bradley W., 4,995,604, Cl. 272-122.000.
Smith, Charles R., to Sherman Industries. Control system for automatic car wash blower. 4,995,136, Cl. 15-312.100.
Smith, Don W., to CMI Corporations. Center bar inserter. 4,995,758, Cl. 404-88.000.
Smith, Douglas R.: *See*—
Kellems, Kenneth K.; Ryczek, William F.; and Smith, Douglas R., 4,995,323, Cl. 108-157.000.
Smith, George A.: *See*—
Cameron, Frank L.; and Smith, George A., 4,995,886, Cl. 29-623.000.
Smith, Jack E., to General Motors Corporation. Programmed air leak for deflatable weatherstrip system. 4,995,196, Cl. 49-477.000.
Smith, Jay L.: *See*—
Smith, Roger E.; Astill, Mark E.; Smith, Jay L.; and Thorne, Gale H., 4,995,402, Cl. 128-771.000.
Smith Kline & French Laboratories Limited: *See*—
Carlin, Brian A. C.; Healey, John N. C.; Leonard, Graham S.; and Tovey, Geoffrey D., 4,996,222, Cl. 514-400.000.
Smith and Nephew Associated Companies Limited: *See*—
Lang, Stephen M.; and Webster, David F., 4,995,382, Cl. 128-156.000.
Smith & Nephew Richards Inc.: *See*—
Demane, Michael; Fallin, Thomas W.; Garner, Steve; and Schryver, Jeff, 4,995,883, Cl. 623-23.000.
Smith, Richard D.; Knowles, Steve; Cassady, R. J.; Smith, William; and Simon, Mark A., to Olin Corporation. Performance arcjet thruster. 4,995,231, Cl. 60-203.100.
Smith, Roger E.; Astill, Mark E.; Smith, Jay L.; and Thorne, Gale H., to Thorne, Smith, Astill Technologies, Inc. Medical droplet whole blood and like monitoring. 4,995,402, Cl. 128-771.000.
Smith, Roland A.: *See*—
Morley, Robert S.; Smith, Roland A.; and Sayre, Paul D., 4,996,684, Cl. 370-100.100.
Smith, Ronald J., to Imo Industries, Inc. Flow switch. 4,996,396, Cl. 200-81.90M.
Smith, Stanley D.: *See*—
Knittel, Gerald H.; Smith, Stanley D.; Spector, Richard C.; and McClintock, Jack M., 4,996,088, Cl. 428-40.000.
Smith, Timothy C. Fine artist paint brush rest. 4,995,515, Cl. 211-65.000.
Smith, Victoria L.; Wilcox, Wayne F.; and Harman, Gary E., to Cornell Research Foundation, Inc. Biological control of phytophthora by trichoderma. 4,996,157, Cl. 435-254.000.
Smith, William: *See*—
Smith, Richard D.; Knowles, Steve; Cassady, R. J.; Smith, William; and Simon, Mark A., 4,995,231, Cl. 60-203.100.
SmithKline Beecham Corporation: *See*—
Cousins, Russell D.; Frazee, James S.; Gleason, John G.; and Hall, Ralph F., 4,996,214, Cl. 514-311.000.
Smothers, Willaim K.; Monroe, Bruce M.; and Chan, Dominic M., to Du Pont de Nemours, E. I., and Company. Holographic photopolymer compositions and elements containing a ring-opening monomer. 4,996,120, Cl. 430-2.000.
SMS Hasenclever GmbH: *See*—
Groos, Horst; and Schutte, Karl-Heinz, 4,995,253, Cl. 72-257.000.
SMS Sutton, Inc.: *See*—
Groos, Horst; and Schutte, Karl-Heinz, 4,995,253, Cl. 72-257.000.
Smyly, George M., Sr. Crab pot managing device. 4,995,187, Cl. 43-8.000.
Snelling, Peter J. Filters. 4,995,968, Cl. 210-108.000.
Snow Brand Milk Products Co., Ltd.: *See*—
Hori, Tomoshige; and Itoh, Kensuke, 4,995,731, Cl. 374-43.000.
Sasaki, Hirotaka; Tanaka, Aguri; Inagaki, Hiroyuki; Suzuki, Tatsuo; and Asakura, Kenji, 4,995,871, Cl. 604-110.000.
Snow, Roy W., Jr. Method and device for stabilizing the path of a drilling tool. 4,995,466, Cl. 175-61.000.
Snow, Stephen: *See*—
Gracey, Michael; Hopkins, Frank; Robinson, Jennifer; and Snow, Stephen, 4,996,232, Cl. 514-474.000.
So, Ying H., to Dow Chemical Company, The. Polymers containing amide moieties and a process for their preparation. 4,996,281, Cl. 528-73.000.
Societe Anonyme de Telecommunications: *See*—
Rouquier, Pierre; Pele, Michel; Ic, Andre ; and Crestey, Pierre, 4,995,236, Cl. 62-51.100.
Sutour, Laurent, 4,995,722, Cl. 356-152.000.
Societe Anonyme dite: Alcatel Satman: *See*—
Kovac, Josip; and Ferreol-Ragotin, Andre , 4,995,600, Cl. 270-45.000.
Societe Sogefina, Societe De Gestion Financiere Armoricaine: *See*—
Herriau, Auguste; and Herriau, Paul, 4,995,325, Cl. 111-189.000.
Soderberg, Per Olof, to Astra Meditec Aktiebolag. Tool for a prosthetic part. 4,995,810, Cl. 433-141.000.
Soderwall, Marja-Liisa: *See*—
Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; and Sundquist, Hannu K., 4,996,225, Cl. 514-428.000.
Soga, Kunio; Okada, Kazuo; Tanaka, Noriaki; Sogame, Morio; and Tsujino, Toshio, to Ube Industries, Ltd. Method of preventing adherence of ash to gasifier wall. 4,995,193, Cl. 48-197.00R.
Sogame, Morio: *See*—
Soga, Kunio; Okada, Kazuo; Tanaka, Noriaki; Sogame, Morio; and Tsujino, Toshio, 4,995,193, Cl. 48-197.00R.
Solano, David W.: *See*—
Borden, Thomas E.; Nestor, Charles R.; and Solano, David W., 4,995,822, Cl. 439-161.000.
Sollner, Gerhardt: *See*—
Behdorf, Hans; Singe, Thomas; and Sollner, Gerhardt, 4,996,095, Cl. 428-215.000.
Solomon, Donald F., to Product Research and Development. Reverse osmosis system and automatic cycling booster pump therefor. 4,995,793, Cl. 417-403.000.
Soma, Utami; Koseki, Yasufumi; and Asakawa, Minoru, to Konica Corporation. Power source unit for image recording apparatus. 4,996,625, Cl. 361-87.000.
Sommer, Alexa: *See*—
Heinz, Hans-Detlef; Kohler, Burkhard; Meyer, Rolf-Volker; Reinking, Klaus; and Sommer, Alexa, 4,996,256, Cl. 524-112.000.
Somogyi, Maria: *See*—
Ferenczi, Gyorgy; Erdelyi, Katalin; Somogyi, Maria; Boda, Janos; Fule, Gyorgy; and Aszodi, Gabor, 4,995,939, Cl. 156-627.000.
Sondergeld, Carl H.: *See*—
Rai, Chandra S.; and Sondergeld, Carl H., 4,996,421, Cl. 250-255.000.

Sonobe, Yoji; and Tanimoto, Takao, to Anritsu Corporation. Optical spectrum analyzer with high performance measurement function. 4,995,724, Cl. 356-319.000.

Sonoco Products Company: *See—*
Wilfong, Harry B., Jr., 4,995,860, Cl. 493-195.000.

Sony Corporation: *See—*
Maeda, Yasuaki, 4,996,678, Cl. 369-32.000.
Murano, Kanji; and Miyaoka, Senri, 4,996,667, Cl. 365-117.000.
Naito, Hidefumi; Sarugaku, Toshio; and Tokuhara, Masaharu, 4,996,595, Cl. 358-150.000.
Suzuki, Hiroyuki; and Araki, Shigeo, 4,996,671, Cl. 365-203.000.
Urayama, Kiyoshi; and Ozawa, Kazuo, 4,995,565, Cl. 242-71.800.

Sorlie, Kjell: *See—*
Mikkelsen, Jan; and Sorlie, Kjell, 4,995,469, Cl. 180-89.130.

Sosogi, Toshiro: *See—*
Okamura, Yasushi; Sosogi, Toshiro; and Takaki, Kosuke, 4,995,161, Cl. 29-568.000.

Spann, Michael L.: *See—*
Walls, W. Alan; Estes, Elvin; Manifold, Steve M.; Spann, Michael L.; and Gully, John H., 4,996,016, Cl. 264-229.000.

Spassov, Kamen B.: *See—*
Lingorski, Nikola A.; Hadjiiski, Mincho B.; Yovchev, Rumen B.; Spassov, Kamen B.; and Savov, Peter H., 4,995,732, Cl. 374-139.000.

Spatafora, Mario; and Gamberini, Antonio, to G.D. Societa' per Azioni. Continuous wrapping machine. 4,995,223, Cl. 53-176.000.

Specialty Connector Company, Inc.: *See—*
Thommen, Robert L.; and Mohammed, Jihan J., 4,995,832, Cl. 439-578.000.

Spector, Richard C.: *See—*
Knittel, Gerald H.; Smith, Stanley D.; Spector, Richard C.; and McClintock, Jack M., 4,996,088, Cl. 428-40.000.

Spectra, Inc.: *See—*
Hine, Nathan P.; and Wells, Robert L., Jr., 4,995,940, Cl. 156-629.000.

Spehar, Edward R.: *See—*
Colin, Laurence; and Spehar, Edward R., 4,995,540, Cl. 222-132.000.

Spence, Jean E.: *See—*
O'Brien, Michael J.; Spence, Jean E.; Skiff, Ronald H.; Vogel, Gerald J.; and Prasad, Ravi, 4,996,317, Cl. 544-274.000.

Spencer, Kenneth W.; Horvat, David T.; and MacKenzie, Peter A., to National Slag Limited. Enclosures for slag pelletization apparatus and method of operation. 4,995,894, Cl. 65-19.000.

Speranza, George P.; and Lin, Jiang-Jen, to Texaco Chemical Company. Novel synthesis of cyclic compounds. 4,996,315, Cl. 540-454.000.

Speranza, George P.: *See—*
Cuscurida, Michael; Su, Wei-Yang; and Speranza, George P., 4,996,294, Cl. 528-421.000.

Sperry Marine Inc.: *See—*
Gasser, Ernest S., 4,996,647, Cl. 364-484.000.

Spier, I. Martin, to Cooper, Leonard; and Cooper, Judith, a part interest. High tech footwear. 4,995,173, Cl. 36-29.000.

Spies, Brian R., to Atlantic Richfield Company. Method and apparatus for cancelling powerline noise in geophysical electromagnetic exploration. 4,996,484, Cl. 324-334.000.

Spin-Alizer Corporation: *See—*
Walker, Grant W., 4,995,613, Cl. 273-183.00C.

Spitzer, J. George: *See—*
Osipow, Lloyd I.; Marra, Dorothea C.; and Spitzer, J. George, 4,996,240, Cl. 521-78.000.

Spogliarich, Roberto: *See—*
Cullen, William R.; Fryzuk, Michael D.; James, Brian R.; Kang, Guo-Jun; Kutney, James P.; Spogliarich, Roberto; and Thorburn, Ian S., 4,996,361, Cl. 564-304.000.

Spooner, James P.; and Stiles, Alvin B., to Rhone-Poulenc Inc. Catalyst support material containing lanthanides. 4,996,031, Cl. 423-213.200.

Sprecher Energie AG: *See—*
Kuhn, Max; and Schmidt, Rudi, 4,996,397, Cl. 200-144.00B.

Spriestersbach, Jochen: *See—*
Dagustany, Amer; Spriestersbach, Jochen; Gunther, Bernd; and Knall, Gerhard, 4,995,917, Cl. 148-3.000.

Springer, Terry L.: *See—*
Keller, Richard F.; Springer, Terry L.; and Jeanquart, Jeffrey J., 4,995,333, Cl. 118-300.000.

Springs Industries, Inc.: *See—*
Cooke, William M.; Hendrix, James E.; and Tolbert, Thomas W., 4,996,099, Cl. 428-245.000.

Sprunger, Paul C.: *See—*
Briscoe, Terry L.; and Sprunger, Paul C., 4,995,176, Cl. 37-141.00R.

Square D Company: *See—*
Farrington, Ronald L., 4,996,646, Cl. 364-483.000.

Sta-Rite Industries, Inc.: *See—*
Brooks, Gary L., 4,995,523, Cl. 220-4.120.

Staar, Marcel J. H., to Starr Development Company, S.A. Automatic changing apparatus for a recording medium. 4,996,680, Cl. 369-37.000.

Stab, Rudolf, to Albert-Frankenthal AG. Device for halting sheet products. 4,995,858, Cl. 493-445.000.

Stabra AG: *See—*
Lehtonen, Paavo; Aaltonen, Pirkko; and Karilainen, Ulla, 4,996,062, Cl. 426-8.000.

STAC Electronics: *See—*
George, Glen A.; and Whiting, Douglas L., 4,996,690, Cl. 371-37.100.

Stadium Consultants International Inc.: *See—*
Brisbin, Brian; McCaffrey, Felim; and Sheffield, Peter, 4,995,203, Cl. 52-6.000.

Stadler, Ewald E.: *See—*
Gruber, Harald; Hinrichsmeyer, Kurt; Horbach, Heinz G.; and Stadler, Ewald E., 4,996,585, Cl. 357-74.000.

Stahl, Rainer: *See—*
Schill, Jurgen; Heene, Hans F.; Stahl, Rainer; and Weber, Friedrich, 4,995,790, Cl. 417-360.000.

Stahlecker, Fritz, to Stahlecker, Hans, a part interest. Process and an arrangement for picking up a yarn end of a spool package during a piecing operation. 4,995,229, Cl. 57-261.000.

Stahlecker, Hans: *See—*
Stahlecker, Fritz, 4,995,229, Cl. 57-261.000.

Stanley, David R.: *See—*
Birchall, James D.; Mockford, Mary J.; and Stanley, David R., 4,996,174, Cl. 501-87.000.

Stanley Electric Co., Ltd.: *See—*
Okazaki, Kunio; and Ishikawa, Kiyomitsu, 4,996,719, Cl. 455-606.000.

Stanley Electric Corporation: *See—*
Tanaka, Hirokazu; Ishikawa, Kiyomitsu; and Tanabe, Tohru, 4,996,415, Cl. 250-221.000.

Stanley Works, The: *See—*
Kellems, Kenneth K.; Ryczek, William F.; and Smith, Douglas R., 4,995,323, Cl. 108-157.000.

Starr Development Company, S.A.: *See—*
Staar, Marcel J. H., 4,996,680, Cl. 369-37.000.

Steckler, Edward T. Chalking line retainer. 4,995,152, Cl. 24-129.00R.

Steele, Glenn: *See—*
Salem, Ronald R.; Thomas, Peter; and Steele, Glenn, 4,996,298, Cl. 530-395.000.

Steele, Robert E.: *See—*
Diliello, Laura K.; Miller, Gregory D.; and Steele, Robert E., 4,995,692, Cl. 350-96.160.

Steers, Michel; Hazan, Jean-Pierre; and Delmas, Gilles, to U.S. Philips Corp. Refrigerating machine comprising an end-of-defrosting detector. 4,995,244, Cl. 62-155.000.

Stegeman, George T.; Zarger, Tony H.; and Outland, Robert J., to General Motors Corporation. Valve train with lash/compliance compensation. 4,995,353, Cl. 123-90.480.

Steiger, Rolf: *See—*
Ficken, Geoffrey E.; Edwards, Douglas J.; Mowforth, Clive W.; Maternaghan, Trevor J.; Steiger, Rolf; and Dolden, Victor W., 4,996,141, Cl. 430-583.000.

Steinke, David M.; Blankenship, Michael; Satterfield, Marshall G.; and Gardner, Philip D., Sr., to Process Bonding, Inc. Door panel. 4,996,090, Cl. 428-71.000.

Steinman, Jory A.: *See—*
Anton, Mark A.; Steinman, Jory A.; Suek, Paul A.; and Johnson, Wayne A., 4,995,688, Cl. 350-96.100.

Stemmer, Gottfried, Jr., to Geimuplast Peter Mundt GmbH & Co. KG. Film jacket for flat articles, particularly slide frames. 4,995,221, Cl. 53-455.000.

Stepaniuk, Nickolas J.; and Lamb, Bruce J., to Mallinckrodt, Inc. Preparation of nitrosyl fluoride. 4,996,035, Cl. 423-386.000.

Stephenson, Martin F., to Boeing Company, The. Wing trailing edge flap mechanism. 4,995,575, Cl. 244-216.000.

Sternlieb, Herschel: *See—*
Siegel, Jodie M.; Sternlieb, Herschel; Connolly, Timothy J.; Greenway, J. Michael; Parker, D. A.; and Simon, Arlene T., 4,995,151, Cl. 26-69.00R.

Sterritt, Janet R.: *See—*
Lowell, Charles R.; and Sterritt, Janet R., 4,995,411, Cl. 134-198.000.

Steunenberg, Robert K.: *See—*
Poa, David S.; Burris, Leslie; Steunenberg, Robert K.; and Tomczuk, Zygmunt, 4,995,948, Cl. 204-1.500.

Stevens, Lawrence R.: *See—*
Conners, Patrick J.; Stevens, Lawrence R.; Gaiser, Don R.; and Pennypacker, Frank C., 4,996,161, Cl. 436-132.000.

Stevenson, Joel O.: *See—*
Guilinger, Terry R.; Kelly, Michael J.; Martin, Samuel B., Jr.; Stevenson, Joel O.; and Tsao, Sylvia S., 4,995,954, Cl. 204-129.750.

Stewart, William J.: *See—*
Krug, James B.; Lenox, Ronald S.; and Stewart, William J., 4,995,910, Cl. 106-287.320.

Stidston, Harvey; and Stidston, Merritte W. Internally rifled projectile. 4,995,318, Cl. 102-503.000.

Stidston, Merritte W.: *See—*
Stidston, Harvey; and Stidston, Merritte W., 4,995,318, Cl. 102-503.000.

Stiefel, Edward I.: *See—*
Coyle, Catherine L.; Greaney, Mark A.; Stiefel, Edward I.; Francis, James N.; and Beltzer, Morton, 4,995,996, Cl. 252-42.700.

Stiles, Alvin B.: *See—*
Spooner, James P.; and Stiles, Alvin B., 4,996,031, Cl. 423-213.200.

Stocker, Rudolf, to Balzers Aktiengesellschaft. Tuning fork quartz manometer. 4,995,263, Cl. 73-702.000.

Stocker, Rudolf; and Schaedler, Walter, to Balzers Aktiengesellschaft. Gas pressure gauge and pressure measuring method. 4,995,264, Cl. 73-702.000.

Stocker, Rudolf, to Balzers Aktiengesellschaft. Degradation and contamination compensate for tuning fork quartz monometer, and method to compensate for tuning quartz degradation and contamination. 4,995,265, Cl. 73-702.000.

Stockl, Rebecca R.: *See*—
Phan, Hieu D.; Carrier, Gary W.; Stockl, Rebecca R.; Tortorici, Frank J.; and Wulf, R. Gary, 4,996,252, Cl. 524-88.000.

Stoehr, James H.: *See*—
Niese, Michael; and Stoehr, James H., 4,995,210, Cl. 52-391.000.

Stowe, Donald H., Jr.; and Benson, Lewis B., to Dravo Lime Company. Process for removing sulfur dioxide from flue gases. 4,996,032, Cl. 423-242.000.

Straehle, Werner: *See*—
Hinrichsmeyer, Kurt; Straehle, Werner; Kelley, Gordon A., Jr.; and Noth, Richard W., 4,996,587, Cl. 357-74.000.

Strahan, Ronald L. Method and apparatus for disposing of water at gas wells. 4,995,460, Cl. 166-267.000.

Strasser, Wilhelm, to Leybold Aktiengesellschaft. Method for carrying out maintenance work on a refrigerator, device and refrigerator for carrying out the method. 4,995,237, Cl. 62-93.000.

Strauch, Richard G.: *See*—
May, Peter T.; Strauch, Richard G.; and Weber, Bob L., 4,996,533, Cl. 342-108.000.

Strauss, Hans: *See*—
Bankel, Adolf; Strauss, Hans; and Kerk, Stephan, 4,995,317, Cl. 102-235.000.

Strickland, H. Allen. Disposable syringe device. 4,995,874, Cl. 604-195.000.

Strobl, Georg, to Johnson Electric S.A. Axial retainers for coated electromagnetic rotor. 4,996,456, Cl. 310-261.000.

Strods, Salvins J.: *See*—
Warnicki, Joseph W.; Rehkopf, Paul G.; Cambier, James L.; and Strods, Salvins J., 4,995,716, Cl. 351-212.000.

Stroud, William: *See*—
Terminella, Frank; Terminella, Manuele; and Stroud, William, 4,995,225, Cl. 53-556.000.

Sturgis, David H., to Precision Castparts Corp. Refractory composition and method for metal casting. 4,996,175, Cl. 501-126.000.

Su, Hyun-Joon, to SamSung Electronics, Ltd. Circuit for controlling a tape tension during search mode. 4,996,466, Cl. 318-6.000.

Su, Wei-Yang: *See*—
Cuscurida, Michael; Su, Wei-Yang; and Speranza, George P., 4,996,294, Cl. 528-421.000.

Suda, Kenichi, to Kabushiki Kaisha Toshiba. Cassette loading apparatus having optimum error protection device. 4,996,612, Cl. 360-96.500.

Suda, Shigeo: *See*—
Yoshida, Kinoto; Fujii, Morizumi; Tsuda, Tokihiro; Suda, Shigeo; Kodama, Osamu; Kuroe, Kazuro; Tanikawa, Takumi; Nishimura, Michihiko; and Munakata, Hideyuki, 4,995,932, Cl. 156-242.000.

Sudo, Mitsuo: *See*—
Takahashi, Yoshio; Sudo, Mitsuo; Arikawa, Takamasa; Nakamura, Kenji; Sato, Izumi; Onogi, Katsuyuki; Iura, Takao; and Ishida, Nobuji, 4,995,505, Cl. 198-468.400.

Suek, Paul A.: *See*—
Anton, Mark A.; Steinman, Jory A.; Suek, Paul A.; and Johnson, Wayne A., 4,995,688, Cl. 350-96.100.

Suenaga, Masashi: *See*—
Saito, Osamu; Kamezaki, Hisamitsu; Suenaga, Masashi; Nagai, Ryo; Iuchi, Shinichiro; Watanabe, Hitoshi; and Fujiwara, Hideo, 4,996,089, Cl. 428-64.000.

Suga, Shuzo; Satake, Masaki; and Sasaoka, Senzo, to Fuji Photo Film Co., Ltd. Silver halide photographic material. 4,996,130, Cl. 430-264.000.

Sugi, Hideo: *See*—
Sekikawa, Ayako; Sugi, Hideo; and Takahashi, Ryoichi, 4,996,220, Cl. 514-372.000.

Sugisaki, Tsutomu: *See*—
Miyoshi, Takahito; Kanazawa, Minoru; Sugisaki, Tsutomu; Yamada, Takuzi; and Okuzawa, Yasutoshi, 4,995,199, Cl. 51-326.000.

Sugiura, Muneharu, to Canon Kabushiki Kaisha. Photographic lens free from forming of ghost image. 4,995,708, Cl. 350-427.000.

Sugiura, Sadanobu: *See*—
Ooya, Satoshi; Sugiura, Sadanobu; Kawashima, Teruhisa; and Kawamura, Toshio, 4,995,535, Cl. 222-607.000.

Sugiyama, Masami: *See*—
Kawagoe, Nobukazu; Sugiyama, Masami; and Inaba, Masahito, 4,995,727, Cl. 356-402.000.

Sumimoto, Haruyoshi: *See*—
Hashida, Hideo; Kanno, Hideki; Okada, Senri; Nakamura, Kokichi; and Sumimoto, Haruyoshi, 4,996,402, Cl. 219-10.410.

Sumitomo Cement Co., Ltd.: *See*—
Takagi, Shigehide; Yano, Hideo; Oku, Takashi; Shigeru, Keijiro; Kuboto, Yoshifumi; and Shishikura, Tsutomu, 4,996,177, Cl. 501-153.000.

Sumitomo Electric Industries, Ltd.: *See*—
Fujimori, Naoji; Harada, Keizo; Yazu, Shuji; and Jodai, Tetsuji, 4,996,185, Cl. 505-1.000.
Higaki, Kenjiro; Harada, Keizo; Fujimori, Naoji; Itozaki, Hideo; and Yazu, Shuji, 4,996,190, Cl. 505-1.000.
Sasaki, Goro, 4,996,163, Cl. 437-5.000.

Summagraphics Corporation: *See*—
Zalenski, Thomas C.; and Barbetti, Jamie L., 4,996,393, Cl. 178-19.000.

Summers, Roger L., to Bridgestone/Firestone, Inc. Ring dispenser. 4,995,531, Cl. 221-75.000.

Sunami, Sadakatsu. Car theft proofing system. 4,996,514, Cl. 340-426.000.

Sunano, Hironori, to Sharp Kabushiki Kaisha. Folding electronic device. 4,996,522, Cl. 340-700.000.

Sundquist, Hannu K.: *See*—
Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; and Sundquist, Hannu K., 4,996,225, Cl. 514-428.000.

Sunds Defibrator Rauma Oy: *See*—
Ahlgren, Aaro, 4,995,988, Cl. 210-784.000.

Sundstrand Corporation: *See*—
Brown, Paul D.; Godecker, William J.; and Parme, Charles B., 4,995,792, Cl. 417-366.000.

Sustena, Inc.: *See*—
Wridge, Wilbur S., Jr.; and Everard, Lloyd D., 4,995,124, Cl. 5-450.000.

Suter, Michael: *See*—
Ballenger, William; Sherman, Wayne; and Suter, Michael, 4,995,973, Cl. 210-209.000.

Sutherland, Derek R.; Ramsay, Michael V. J.; Ward, John B.; Porter, Neil; Noble, Hazel M.; Fletton, Richard A.; and Noble, David, to American Cyanamid Company. Macrolide antibiotics. 4,996,228, Cl. 514-450.000.

Sutour, Laurent, to Societe Anonyme De Telecommunications. System for assisting hovering aircraft to land on the platform of a vessel. 4,995,722, Cl. 356-152.000.

Sutton, Arthur E., to Lucas Industries. Running control for a gas turbine engine. 4,995,232, Cl. 60-243.000.

Suvanto, Erkki, to Neste Oy. Method for manufacture of spike rivits. 4,996,014, Cl. 264-113.000.

Suyama, Yasuyuki, to Tsubakimoto Chain Co. Apparatus for rotating a wrist of a robot. 4,995,782, Cl. 414-732.000.

Suzuki, Haruo; and Satoh, Atushi, to Jidosha Kiki Co., Ltd. Negative pressure booster equipment. 4,995,302, Cl. 91-369.300.

Suzuki, Hiroyuki; and Araki, Shigeo, to Sony Corporation. Semiconductor memory device. 4,996,671, Cl. 365-203.000.

Suzuki Jidosha Kogyo Kabushiki Kaisha: *See*—
Machino, Atsumi, 4,995,352, Cl. 123-90.390.

Suzuki, Jiro: *See*—
Matsuda, Shohei; Suzuki, Jiro; Sato, Tsuyoshi; and Tashima, Kazutoshi, 4,995,677, Cl. 303-113.000.

Suzuki, Kazumi: *See*—
Nasu, Rikuo; Komyoji, Terumasa; Nakajima, Toshio; Suzuki, Kazumi; Ito, Keiichiro; Oshima, Takeshi; and Yoshimura, Hideshi, 4,995,898, Cl. 71-90.000.

Suzuki, Koichi: *See*—
Oyama, Takuji; Suzuki, Koichi; and Mizuhashi, Mamoru, 4,996,105, Cl. 428-336.000.

Suzuki, Motoko: *See*—
Nishimura, Yasuhiro; Suzuki, Motoko; and Fukuda, Yozo, 4,996,200, Cl. 514-185.000.

Suzuki, Seizoh; and Endou, Osamu, to Ricoh Company, Ltd. Objective lens for optical disk. 4,995,710, Cl. 350-480.000.

Suzuki, Shigeo: *See*—
Kobayashi, Kinzo; Nakayama, Shinichi; and Suzuki, Shigeo, 4,995,482, Cl. 188-73.100.

Suzuki, Tatsunosuke: *See*—
Aonuma, Mitsuyoshi; Suzuki, Tatsunosuke; Isomura, Satoru; and Nishimura, Koichi, 4,996,264, Cl. 525-179.000.

Suzuki, Tatsuo: *See*—
Sasaki, Hirotaka; Tanaka, Aguri; Inagaki, Hiroyuki; Suzuki, Tatsuo; and Asakura, Kenji, 4,995,871, Cl. 604-110.000.

Suzuki, Yasumichi: *See*—
Kadowaki, Toshihiro; Ohnishi, Tetsuya; Katoh, Koichi; Suzuki, Yasumichi; and Honma, Toshio, 4,996,591, Cl. 358-80.000.

Suzuki, Yorikatsu, to Kabushiki Kaisha Meidensha. Torque control system for engine performance test machine for internal combustion engines. 4,995,139, Cl. 73-116.000.

Svenkeson, Penny: *See*—
Byers, Larry L.; Tsang, Kay; Scheuneman, James H.; and Svenkeson, Penny, 4,996,588, Cl. 371-16.500.

Swain, Ian D.: *See*—
Orpwood, Roger; and Swain, Ian D., 4,995,628, Cl. 280-304 100.

Swann, Peter R.: *See*—
Jones, Joseph S.; and Swann, Peter R., 4,996,433, Cl. 250-443.100.

Swartzendruber, Ray E.: *See*—
Cole, Theodore J.; and Swartzendruber, Ray E., 4,995,343, Cl. 119-53.000.

Switzer, Robert D. Cartridge clip. 4,995,179, Cl. 42-50.000.

Sydansk, Robert D., to Marathon Oil Company. Well kill treatment for oil field wellbore operations. 4,995,461, Cl. 166-295.000.

Syngene, Inc.: *See*—
Heller, Michael J.; and Jablonski, Edward J., 4,996,143, Cl. 435-6.000.

Systemworks Limited: *See*—
Gateley, Martin F., 4,995,144, Cl. 16-261.000.

Sznyter, Laura A.: *See*—
Brooks, Joan E.; and Sznyter, Laura A., 4,996,151, Cl. 435-172.300.

Tabata, Yoshio: *See*—
Kanemitsu, Norio; Tabata, Yoshio; and Wakabayashi, Masaru, 4,996,603, Cl. 358-462.000.

Tabor, Carroll, Adjustable dispenser for holding boxes of plastic bags. 4,995,530, Cl. 221-46.000.

Tabunschik, Ivan A.: *See—*
Paton, Boris E.; Vasiliev, Vsevolod V.; Bogdanovsky, Valentin A.; Shelekhov, Konstantin V.; Gavva, Viktor M.; Bigdash, Vladimir D.; Tabunschik, Ivan A.; and Ilchishin, Andrei P., 4,996,409, Cl. 219-130.010.

Tachi-S. Co., Ltd.: *See—*
Fujii, Harutoshi, 4,995,580, Cl. 248-421.000.
Urai, Muneharu, 4,995,926, Cl. 156-78.000.

Tachibana, Hiroshi: *See—*
Kai, Osamu; Tsukada, Masaaki; and Tachibana, Hiroshi, 4,995,497, Cl. 194-318.000.

Tachiwana, Kazuo, to Hoya Corporation. Optical glass. 4,996,173, Cl. 501-73.000.

Tada, Akihiro; Kiriu, Takashi; and Arakawa, Motoomi, to Orient Chemical Industries, Ltd. Toner for developing electrostatic latent images. 4,996,339, Cl. 556-181.000.

Tada, Tatsuo, to Nippon Seiko Kabushiki Kaisha. Seat belt retraction and switch with peripheral internal gearing and planetary gearing assembly. 4,996,395, Cl. 200-61.58B.

Taft, Philip A.: *See—*
Hazelden, Roger J.; Sheppard, Ian J.; and Taft, Philip A., 4,995,480, Cl. 188-1.110.

Tagawa, Koichi, to Maeda Industries, Ltd. Bicycle speed change lever assembly. 4,995,280, Cl. 74-480.00R.

Tagawa, Motoyuki: *See—*
Inaba, Makoto; Hayashi, Masaaki; Hashiguchi, Toshihiko; Hibino, Hiroki; Sasa, Hiroyuki; Barlow, David E.; Ohshima, Yutaka; Ishihara, Kohichiro; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Klosterman, Frank; and Goodman, Jack, 4,995,396, Cl. 128-654.000.

Tagawa, Takao, to Sharp Kabushiki Kaisha. Superconductor magnetic image detection device. 4,996,392, Cl. 178-18.000.

Tager, Benny L. Toilet seat closing device. 4,995,120, Cl. 4-251.000.

Taguchi, Toru: *See—*
Saeki, Kenji; Fukuhara, Hiroshi; Agoo, Tokinori; Taguchi, Toru; Miki, Hisaya; Haneda, Yutaka; and Yoshimoto, Sadao, 4,996,372, Cl. 568-717.000.

Taguchi, Yoshinori: *See—*
Terazawa, Tadashi; Nakashima, Hiroshi; and Taguchi, Yoshinori, 4,995,363, Cl. 123-399.000.

Tai, King L.: *See—*
Pimpinella, Richard J.; Segelken, John M.; Tai, King L.; and Thompson, Ross J., 4,995,695, Cl. 350-96.200.

Tajima, Noriyuki; Ueno, Shigeto; and Sano, Tetsuhiro, to Matsushita Electric Industrial Co., Ltd. Reciprocating printing cartridge extending beyond casing sidewall opening. 4,995,748, Cl. 400-691.000.

Takada, Mitsuru; Itoh, Hiroshi; Takahashi, Tokuyuki; and Funahashi, Makoto, to Toyota Jidosha Kabushiki Kaisha. Accumulator control device for hydraulic control device for automatic transmission for vehicle with engine load dependent backup control. 4,995,284, Cl. 74-868.000.

Takada, Shun: *See—*
Murai, Kazuhiro; Kawashima, Yasuhiko; Takada, Shun; and Kagawa, Nobuaki, 4,996,138, Cl. 430-522.000.

Takagaki, Hisashi: *See—*
Ishikawa, Youhei; Hiratsuka, Toshiro; Abe, Hirotsugu; Takagaki, Hisashi; and Yamashita, Sadao, 4,996,506, Cl. 333-219.100.

Takagi, Atsushi, to Fuji Photo Film Co., Ltd. Jam detecting and displaying device in an image recording apparatus. 4,996,557, Cl. 355-50.000.

Takagi, Osamu, to Brother Kogyo Kabushiki Kaisha. Method for producing gloss image on image recording medium and apparatus for making the gloss image on the medium. 4,996,553, Cl. 355-27.000.

Takagi, Shigehide; Yano, Hideo; Oku, Takashi; Shigeru, Keijiro; Kuboto, Yoshifumi; and Shishikura, Tsutomu, to Sumitomo Cement Co., Ltd. Sintered alumina article with high flexural strength and process for producing same. 4,996,177, Cl. 501-153.000.

Takahama, Kazuhide: *See—*
Haraga, Koichi; Takahama, Kazuhide; and Uchimura, Mitsuo, 4,996,539, Cl. 346-76.0PH.

Takahashi, Fumitaka, to Kawai Gakki Seisakusho Co., Ltd. Action mechanism for the piano. 4,995,291, Cl. 84-237.000.

Takahashi, Hironori; Aoshima, Shinichiro; and Tsuchiya, Yutaka, to Hamamatsu Photonics Kabushiki Kaisha. Electro-optic voltage detector having a transparent electrode. 4,996,475, Cl. 324-96.000.

Takahashi, Hiroshi; Ohta, Atushi; and Akasaki, Sayumi, to Sanyo Chemical Industries, Ltd. Carboxylic acids and methods of preparing the same. 4,996,356, Cl. 562-587.000.

Takahashi, Kaoru; Tsumiji, Akio; and Shutoku, Ryuji, to Nohmi Bosai Co., Ltd. Fire alarm system. 4,996,518, Cl. 340-518.000.

Takahashi, Kenji: *See—*
Iwasaki, Katsuhiro; Takahashi, Kenji; Inoue, Shigeru; Tanabe, Haruyoshi; Kawakami, Masahiro; and Terada, Osamu, 4,995,906, Cl. 75-502.000.

Takahashi, Kouji: *See—*
Kashida, Motokazu; Masui, Toshiyuki; Fukatsu, Tsutomu; Takei, Masahiro; Takahashi, Kouji; and Sasatani, Tomohiko, 4,996,607, Cl. 360-18.000.

Takahashi, Ryoichi: *See—*
Sekikawa, Ayako; Sugi, Hideo; and Takahashi, Ryoichi, 4,996,220, Cl. 514-372.000.

Takahashi, Satoshi: *See—*
Motoi, Toshihiro; Nakazawa, Toshihiko; Takesue, Toshihiro; Takahashi, Satoshi; and Murahashi, Takashi, 4,996,540, Cl. 346-108.000.

Takahashi, Tokuyuki: *See—*
Takada, Mitsuru; Itoh, Hiroshi; Takahashi, Tokuyuki; and Funahashi, Makoto, 4,995,284, Cl. 74-868.000.

Takahashi, Toshiaki; and Sato, Yasuji, to Kabushiki Kaisha Toshiba. Side-tone adjusting system and method for key telephone system establishing a plurel kinds of speaking paths. 4,996,710, Cl. 379-202.000.

Takahashi, Toshio; Matsuno, Kazumasa; Morimoto, Masaru; and Ochiai, Fumio, to Tsubakimoto Chain Co. Sintered oil-retaining bushed chain having roller. 4,995,852, Cl. 474-91.000.

Takahashi, Yoshio; Sudo, Mitsuo; Arikawa, Takamasa; Nakamura, Kenji; Sato, Izumi; Onogi, Katsuyuki; Iura, Takao; and Ishida, Nobuji, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Transfer method and device and driving system therefor for transfer presses. 4,995,505, Cl. 198-468.400.

Takaki, Kosuke: *See—*
Okamura, Yasushi; Sosogi, Toshiro; and Takaki, Kosuke, 4,995,161, Cl. 29-568.000.

Takami, Kazuo: *See—*
Okamoto, Kyoichi; and Takami, Kazuo, 4,995,275, Cl. 74-7.00A.

Takasu, Yoshio: *See—*
Yoshinaga, Kazuo; Miyazaki, Takeshi; Ohnishi, Toshikazu; Kurabayashi, Yutaka; Takasu, Yoshio; and Kobayashi, Tadashi, 4,995,705, Cl. 350-350.00S.

Takata, Hiroyuki: *See—*
Sakata, Isao; Nakajima, Susumu; Koshimizu, Koichi; Samejima, Natsuki; Inohara, Kazumi; Takata, Hiroyuki; Yamauchi, Hirohiko; Ueda, Nobuo; and Hazue, Masaaki, 4,996,312, Cl. 540-145.000.

Takatsuki, Nobuyuki; and Shukuri, Kyoichi, to Nippon Sheet Glass Co., Ltd. Magnetic disk with textured area on part of disk. 4,996,622, Cl. 360-135.000.

Takayama, Shuichi: *See—*
Inaba, Makoto; Hayashi, Masaaki; Hashiguchi, Toshihiko; Hibino, Hiroki; Sasa, Hiroyuki; Barlow, David E.; Ohshima, Yutaka; Ishihara, Kohichiro; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Klosterman, Frank; and Goodman, Jack, 4,995,396, Cl. 128-654.000.

Takeda, Akihiro: *See—*
Yamagishi, Jun; Nishikawa, Hiromitsu; and Takeda, Akihiro, 4,995,568, Cl. 242-125.100.

Takeda Chemical Industries, Ltd.: *See—*
Nakamura, Nobuto; Satoh, Hiroshi; Matsuo; and Esquivel, Misael U., 4,996,236, Cl. 514-659.000.

Takeda, Hiroshi. Electric toothbrush. 4,995,131, Cl. 15-22.100.

Takeda, Shigehumi: *See—*
Kimura, Masayuki; Hosaka, Kunio; Takeda, Shigehumi; and Mitsuhashi, Hiroshi, 4,996,331, Cl. 549-229.000.

Takeda, Yoshimitsu: *See—*
Ichinose, Hisao; Takeda, Yoshimitsu; Sato, Tsuyoshi; and Imai, Hiroshi, 4,995,665, Cl. 296-213.000.

Takegawa, Ichiro: *See—*
Sakaguchi, Yasuo; Takegawa, Ichiro; Takemoto, Makoto; and Murase, Masanori, 4,996,125, Cl. 430-66.000.

Takei, Masahiro: *See—*
Kashida, Motokazu; Masui, Toshiyuki; Fukatsu, Tsutomu; Takei, Masahiro; Takahashi, Kouji; and Sasatani, Tomohiko, 4,996,607, Cl. 360-18.000.

Takeichi, Michifumi: *See—*
Ohmura, Keiji; Okuno, Sumio; Takeichi, Michifumi; Okazaki, Masato; and Tsuruda, Hitoshi, 4,995,321, Cl. 105-397.000.

Takemoto, Makoto: *See—*
Sakaguchi, Yasuo; Takegawa, Ichiro; Takemoto, Makoto; and Murase, Masanori, 4,996,125, Cl. 430-66.000.

Takemoto, Satoru; Kaneko, Rokusaburo; Miwa, Matsuyuki; and Makino, Seiji, to Fuji Photo Film Co., Ltd. Optical system for use with a viewfinder. 4,996,555, Cl. 355-44.000.

Takemura, Fumio: *See—*
Nakada, Toshio; Takemura, Fumio; Sema, Yoshihito; and Kataoka, Kazuhito, 4,995,999, Cl. 252-62.550.

Takemura, Yasuhiko: *See—*
Enyo, Hiroji; Iwanaga, Shin-ichiro; and Takemura, Yasuhiko, 4,996,134, Cl. 430-286.000.

Takesue, Toshihiro: *See—*
Motoi, Toshihiro; Nakazawa, Toshihiko; Takesue, Toshihiro; Takahashi, Satoshi; and Murahashi, Takashi, 4,996,540, Cl. 346-108.000.

Takeuchi, Koji: *See—*
Hirai, Kiyomiki; Takeuchi, Koji; Ito, Nobuo; and Abe, Masahiro, 4,996,286, Cl. 528-123.000.

Takido, Mine: *See—*
Honma, Yasushi; Tamaki, Hajime; Magaribuchi, Tetsuo; and Takido, Mine, 4,996,217, Cl. 514-338.000.

Talgam, Yoav; Reed, Paul A.; Haddad, Elie; and Klingshirn, James A., to Motorola, Inc. Diagnostic mode for a cache. 4,996,641, Cl. 364-200.000.

Tamaki, Hajime: *See—*
Honma, Yasushi; Tamaki, Hajime; Magaribuchi, Tetsuo; and Takido, Mine, 4,996,217, Cl. 514-338.000.

Tambe, Atul; Chu, David; and Cosart, Lee D., III, to Hewlett-Packard Company. Digital gate generation for a signal measurement instrument. 4,996,474, Cl. 324-78.00D.

Tamura Electric Works, Ltd.: *See—*
Kai, Osamu; Tsukada, Masaaki; and Tachibana, Hiroshi, 4,995,497, Cl. 194-318.000.

Tamura, Hideharu: *See*—
Ogawa, Kazufumi; Tamura, Hideharu; and Mino, Norihisa, 4,996,075, Cl. 427-12.000.
Tamura, Kaoru: *See*—
Ohgoda, Makoto; and Tamura, Kaoru, 4,996,542, Cl. 346-108.000.
Tamura, Michio; and Furuki, Fumio, to Honda Giken Kogyo Kabushiki Kaisha. Vehicle sliding roof system. 4,995,667, Cl. 296-216.000.
Tamura, Toshinari: *See*—
Tsukamoto, Shin-ichi; Nagaoka, Hitoshi; Usuda, Shinji; Harada, Masatomi; and Tamura, Toshinari, 4,996,210, Cl. 514-278.000.
Tamura, Yasuaki: *See*—
Nishimura, Eiichi; and Tamura, Yasuaki, 4,995,696, Cl. 350-96.200.
Tanabe, Haruyoshi: *See*—
Iwasaki, Katsuhiro; Takahashi, Kenji; Inoue, Shigeru; Tanabe, Haruyoshi; Kawakami, Masahiro; and Terada, Osamu, 4,995,906, Cl. 75-502.000.
Tanabe Seiyaku Company, Ltd.: *See*—
Honma, Yasushi; Tamaki, Hajime; Magaribuchi, Tetsuo; and Takido, Mine, 4,996,217, Cl. 514-338.000.
Tanabe, Tohru: *See*—
Tanaka, Hirokazu; Ishikawa, Kiyomitsu; and Tanabe, Tohru, 4,996,415, Cl. 250-221.000.
Tanaka, Aguri: *See*—
Sasaki, Hirotaka; Tanaka, Aguri; Inagaki, Hiroyuki; Suzuki, Tatsuo; and Asakura, Kenji, 4,995,871, Cl. 604-110.000.
Tanaka, Hirokazu; Ishikawa, Kiyomitsu; and Tanabe, Tohru, to Stanley Electric Corporation. Apparatus for detecting the presence and position of an object. 4,996,415, Cl. 250-221.000.
Tanaka, Katsuji, to Toshiba Machine Co., Ltd. Electron-beam lithographic apparatus. 4,996,434, Cl. 250-492.300.
Tanaka, Kenji: *See*—
Tsukada, Minoru; Tanaka, Kenji; and Iga, Yoshiro, 4,996,050, Cl. 424-94.200.
Tanaka, Noriaki: *See*—
Soga, Kunio; Okada, Kazuo; Tanaka, Noriaki; Sogame, Morio; and Tsujino, Toshio, 4,995,193, Cl. 48-197.00R.
Tanaka, Shinichi; Hori, Masayuki; and Tozawa, Noriyoshi, to Kabushiki Kaisha Toshiba. Semiconductor memory device. 4,996,572, Cl. 357-23.500.
Tanaka, Shinichiro: *See*—
Kamei, Eiichi; Namba, Hideaki; Ohba, Masahiro; Tanaka, Shinichiro; and Aoki, Keiji, 4,995,364, Cl. 123-442.000.
Tanaka, Takafumi, to Brother Kogyo Kabushiki Kaisha. Edge tracing sewing machine. 4,995,328, Cl. 112-453.000.
Tanaka, Tomoharu: *See*—
Endoh, Tetsuo; Shirota, Riichiro; Momodomi, Masaki; Tanaka, Tomoharu; Masuoka, Fujio; and Watanabe, Shigeyoshi, 4,996,669, Cl. 365-185.000.
Tandy Corporation: *See*—
Heep, Jerry; and Henderson, James, 4,996,709, Cl. 379-160.000.
Sauder, John A.; and Larson, Harold, 4,995,527, Cl. 220-266.000.
Tange, Mark L. Golf ball dispenser and setter. 4,995,614, Cl. 273-201.000.
Tange, Toyokichi: *See*—
Hasegawa, Yukinobu; Shimomura, Hiroyoshi; Murai, Koichi; Maruyama, Masatoshi; and Tange, Toyokichi, 4,996,127, Cl. 430-109.000.
Taniguchi, Yoshihiro; and Hashimoto, Hideaki, to Dainippon Screen Mfg. Co., Ltd. Method and apparatus for image scanning input for an image scanning recording apparatus. 4,996,605, Cl. 358-474.000.
Tanikawa, Takumi: *See*—
Yoshida, Kinoto; Fujii, Morizumi; Tsuda, Tokihiro; Suda, Shigeo; Kodama, Osamu; Kuroe, Kazuro; Tanikawa, Takumi; Nishimura, Michihiko; and Munakata, Hideyuki, 4,995,932, Cl. 156-242.000.
Tanimoto, Takao: *See*—
Sonobe, Yoji; and Tanimoto, Takao, 4,995,724, Cl. 356-319.000.
Tanoi, Satoru, to Oki Electric Industry Co., Ltd. Field-effect transistor load circuit. 4,996,447, Cl. 307-304.000.
Tanuma, Itsuo; Otsuru, Hiromi; and Honda, Toshio, to Bridgestone Corporation. White board. 4,996,110, Cl. 428-343.000.
Taplast SNC di Evans Santagiuliana & C.: *See*—
Santagiuliana, Evans, 4,995,520, Cl. 215-220.000.
Taranishi, Daiya: *See*—
Nakadai, Yoshikazu; Taranishi, Daiya; Hirokawa, Koichi; and Matsumoto, Nobuki, 4,995,602, Cl. 271-207.000.
Tashima, Kazutoshi: *See*—
Matsuda, Shohei; Suzuki, Jiro; Sato, Tsuyoshi; and Tashima, Kazutoshi, 4,995,677, Cl. 303-113.000.
Tate, Takao; Nakamura, Norihiko; Noguchi, Hiroshi; Kawagoe, Michio; Baika, Toyokazu; Kato, Kichiro; Kido, Yoshio; Hirose, Katsuhiko; Nihei, Hiroaki; and Masubuchi, Masahiko, to Toyota Jidosha Kabushiki Kaisha. Intake device of a two stroke engine with supercharger bypass passage. 4,995,347, Cl. 123-65.0BA.
Tate, Takuo; Watanabe, Taketoshi; and Nagura, Hiroyuki, to Nippon Filcon Co., Ltd. Papermaking fabric having recesses on papermaking surface filled with auxiliary wefts. 4,995,428, Cl. 139-383.00A.
Tateno, Tetsuya, to Canon Kabushiki Kaisha. Integrated circuit for level shift. 4,996,443, Cl. 307-264.000.
Taub, Alan I.; Frischmann, Peter G.; and Lee, Minyoung, to General Electric Company. Method and apparatus for parting a deck of amorphous alloy ribbons. 4,995,919, Cl. 148-9.00R.
Tay, Sing P.: *See*—
Ellul, Joseph P.; and Tay, Sing P., 4,996,081, Cl. 427-96.000.
Taylor, Dennis E.; and Goldbeck, Larry J., to Martin Engineering Company. Spring steel tensioner. 4,995,851, Cl. 474-101.000.
Taylor, Edward C.; Kuhnt, Dietmar G.; Shih, Chuan; and Grindey, Gerald B., to Princeton University, The Trustees of. N-(pyrrolo[2,3-d]pyrimidin-3-ylacyl)-glutamic acid derivatives. 4,996,206, Cl. 514-258.000.
Taylor, Larry D.: *See*—
Beck, Jeffrey L.; and Taylor, Larry D., 4,995,465, Cl. 175-27.000.
Tazawa, Kenji; Iwata, Akira; Horigome, Tomoki; and Tohda, Hiroyuki, to Toyko Ohka Kogyo Co. Ltd. Heat-resistant photosensitive resin composition. 4,996,132, Cl. 430-286.000.
TDK Corporation: *See*—
Endo, Shinichi, 4,996,502, Cl. 331-46.000.
Tecle, Haile: *See*—
Bergmeier, Stephen C.; Kester, Jeffrey A.; Moos, Walter H.; Tecle, Haile; and Thomas, Anthony J., 4,996,201, Cl. 514-212.000.
Tecumseh Products Company: *See*—
Kronich, Peter G., 4,995,356, Cl. 123-198.00E.
Teijin Seiki Co., Ltd.: *See*—
Ako, Hidenobu, 4,995,424, Cl. 137-596.000.
Tektronix, Inc.: *See*—
Pope, Keith A., 4,996,478, Cl. 324-158.00P.
Rosenow, Barry L., 4,996,654, Cl. 364-521.000.
Telectronics Pacing Systems, Inc.: *See*—
Harris, Donald L., 4,995,389, Cl. 128-419.00P.
Teledyne Industries, Inc.: *See*—
Wang, Chun T.; and Scanlon, Robert H., 4,995,548, Cl. 228-131.000.
Telefonica De Espana, S.A.: *See*—
Prados, Rafael R., 4,995,820, Cl. 439-157.000.
Telefunken electronic GmbH: *See*—
Kaiser, Reinhold, 4,996,569, Cl. 357-14.000.
Telschow, Kenneth L.: *See*—
Deason, Vance A.; Johnson, John A.; and Telschow, Kenneth L., 4,995,260, Cl. 73-632.000.
Temple, Robert B.; and Colpaert, James J., to Allied-Signal Inc. Integrated disc brake and drum brake construction. 4,995,481, Cl. 188-70.00R.
Tenco Machinery Ltd.: *See*—
Lamoureux, Guy; and Bibeau, Jean-Marie, 4,995,773, Cl. 414-489.000.
Tennant Company: *See*—
Field, Bruce F.; and Kasper, Joseph G., 4,996,468, Cl. 318-587.000.
Terada, Haruhiko: *See*—
Haneda, Shinichi; Terada, Haruhiko; Azuchi, Kazunari; and Gyobu, Kiyohito, 4,996,634, Cl. 362-82.000.
Terada, Osamu: *See*—
Iwasaki, Katsuhiro; Takahashi, Kenji; Inoue, Shigeru; Tanabe, Haruyoshi; Kawakami, Masahiro; and Terada, Osamu, 4,995,906, Cl. 75-502.000.
Terasaki, Akashi: *See*—
Okamoto, Yoshio; Nakamura, Yozo; Uchiyama, Kyoichi; Watanabe, Haruo; Kosuge, Tokuo; Onishi, Akira; Terasaki, Akashi; Ando, Hiroyuki; and Hamashima, Eiji, 4,995,559, Cl. 239-493.000.
Terashima, Hiroshi: *See*—
Aoyagi, Akihiko; Endo, Tatsuya; and Terashima, Hiroshi, 4,996,616, Cl. 360-104.000.
Terazawa, Tadashi; Nakashima, Hiroshi; and Taguchi, Yoshinori, to Aisin Seiki Kabushiki Kaisha. Throttle controller. 4,995,363, Cl. 123-399.000.
Terminella, Frank; Terminella, Manuele; and Stroud, William, to Pacmac, Inc. Compact food tray film wrapping machine. 4,995,225, Cl. 53-556.000.
Terminella, Manuele: *See*—
Terminella, Frank; Terminella, Manuele; and Stroud, William, 4,995,225, Cl. 53-556.000.
Terry, Thomas E.: *See*—
Graham, S. Neal; and Terry, Thomas E., 4,995,503, Cl. 198-392.000.
Tervamaki, Jukka; Heinonen, Mauno; Priha, Matti; and Koivisto, Juha, to Labsystems Oy. Dosage equipment. 4,995,432, Cl. 141-130.000.
Tervo, John N., to Allied-Signal Inc. Butterfly valve method and apparatus. 4,995,414, Cl. 137-1.000.
Tesch, Helmut: *See*—
Gerth, Dale; Ittemann, Peter; and Tesch, Helmut, 4,996,267, Cl. 525-423.000.
Teter, Bruce W. Process for removing hazardous or toxic material from a structure. 4,995,914, Cl. 134-21.000.
Tettman, Richard L.: *See*—
Jacquot, William E.; Tettman, Richard L.; and Davis, Melvin D., 4,995,975, Cl. 210-266.000.
Teudt, Gerald J.: *See*—
Schaffer, Michael; and Teudt, Gerald J., 4,996,515, Cl. 340-426.000.
Texaco Chemical Company: *See*—
Cuscurida, Michael; Su, Wei-Yang; and Speranza, George P., 4,996,294, Cl. 528-421.000.
Speranza, George P.; and Lin, Jiang-Jen, 4,996,315, Cl. 540-454.000.
Texaco Inc.: *See*—
Beaupre, Richard F.; and Jung, Dick Y., 4,995,888, Cl. 55-16.000.
Papke, Brian L.; and Bartley, Leonard S., Jr., 4,995,993, Cl. 252-25.000.
Texas Instruments Incorporated: *See*—
Brighton, Jeffrey E.; and Verret, Douglas P., 4,996,133, Cl. 430-313.000.
Moslehi, Mehrdad M.; and Huang, Steve S., 4,996,077, Cl. 427-38.000.

Paterson, James L.; and Smayling, Michael C., 4,996,668, Cl. 365-185.000.
Pinnavaia, Giuseppe R., 4,995,156, Cl. 29-838.000.
TexPro, Inc.: *See—*
Norman, Richard O., 4,995,534, Cl. 222-511.000.
Textilmaschenenfabrik Dr. Ernst Fehrer Aktiengesellschaft: *See—*
Kis, Ludwig, 4,995,271, Cl. 73-38.000.
Tharman, Paul A.: *See—*
Gonnering, John B.; and Tharman, Paul A., 4,995,357, Cl. 123-198.0DC.
Thedieck, T. Mark. Removable gun rack. 4,995,537, Cl. 224-273.000.
Theodore Aaron Litovitz: *See—*
Barkatt, Aaron, 4,995,984, Cl. 210-670.000.
Thomas, Albert V.: *See—*
Ronsen, Bruce; Arora, Sudershan K.; and Thomas, Albert V., 4,996,195, Cl. 514-23.000.
Thomas, Anthony J.: *See—*
Bergmeier, Stephen C.; Kester, Jeffrey A.; Moos, Walter H.; Tecle, Haile; and Thomas, Anthony J., 4,996,201, Cl. 514-212.000.
Thomas, Charles R. Method of making a therapeutic mattress. 4,995,220, Cl. 53-418.000.
Thomas, Friedrich-Werner; Schadlich-Stubenrauch, Jurgen; and Hediger, Alfred, to Leybold Aktiengesellschaft. Measurement sensor for the detection of temperatures in metal or alloy melts. 4,995,733, Cl. 374-140.000.
Thomas, Glenn R.: *See—*
McKee, Jere L.; Thomas, Glenn R.; Gula, Lance; and Beatty, William E., Jr., 4,996,507, Cl. 335-195.000.
Thomas Industries Incorporated: *See—*
Hetzel, Thomas; and Rozek, Roy J., 4,995,795, Cl. 417-571.000.
Thomas, Peter: *See—*
Salem, Ronald R.; Thomas, Peter; and Steele, Glenn, 4,996,298, Cl. 530-395.000.
Thomas, Robert M.; and Pigeon, Joseph P. R. M., to Northern Telecom Limited. Clock recovery circuit. 4,996,444, Cl. 307-269.000.
Thomassin, Rene : *See—*
Bernard, Louis A.; and Thomassin, Rene , 4,995,574, Cl. 244-17.170.
Thommen, Robert L.; and Mohammed, Jihan J., to Specialty Connector Company, Inc. Connector for connecting to helically corrugated conduit. 4,995,832, Cl. 439-578.000.
Thompson, Donovan S. Heat exchanger with corrugated tubes. 4,995,454, Cl. 165-155.000.
Thompson, Ian: *See—*
Garvey, Michael J.; Griffiths, Ian C.; and Thompson, Ian, 4,995,995, Cl. 252-28.000.
Thompson, Larry F.: *See—*
Houlihan, Francis M.; Reichmanis, Elsa; and Thompson, Larry F., 4,996,136, Cl. 430-313.000.
Thompson, Mark S.: *See—*
Becker, Paul; Powers, Carol; and Thompson, Mark S., 4,996,510, Cl. 338-21.000.
Thompson, Ross J.: *See—*
Pimpinella, Richard J.; Segelken, John M.; Tai, King L.; and Thompson, Ross J., 4,995,695, Cl. 350-96.200.
Thompson, Stephen C., to Westinghouse Electric Corp. Double piston acoustic transducer with selectable directivity. 4,996,674, Cl. 367-158.000.
Thomson Hybrides et Microondes: *See—*
Malbe, Serge; Da Silva, Evelyne; and Fouche, Alain, 4,996,588, Cl. 357-80.000.
Thorburn, Ian S.: *See—*
Cullen, William R.; Fryzuk, Michael D.; James, Brian R.; Kang, Guo-Jun; Kutney, James P.; Spogliarich, Roberto; and Thorburn, Ian S., 4,996,361, Cl. 564-304.000.
Thorn Emi Electronics Limited: *See—*
Voles, Roger, 4,996,428, Cl. 250-332.000.
Thorn EMI plc: *See—*
Shanks, Ian A., 4,995,719, Cl. 353-122.000.
Thorne, Gale H.: *See—*
Smith, Roger E.; Astill, Mark E.; Smith, Jay L.; and Thorne, Gale H., 4,995,402, Cl. 128-771.000.
Thorne, Smith, Astill Technologies, Inc.: *See—*
Smith, Roger E.; Astill, Mark E.; Smith, Jay L.; and Thorne, Gale H., 4,995,402, Cl. 128-771.000.
Thrower, Anthony; and Bates, Kenneth W., to Injectall Limited. Molten metal sampling. 4,995,270, Cl. 73-863.850.
Thuries, Edmond; Dufournet, Denis; and Perret, Michel, to GEC Alsthom SA. High or medium tension circuit breaker. 4,996,399, Cl. 200-148.00A.
Thurston, Inc.: *See—*
Shook, William B., 4,995,753, Cl. 403-24.000.
Tiefenbacher, Rainer: *See—*
Weidmann, Werner; and Tiefenbacher, Rainer, 4,995,447, Cl. 165-44.000.
Tiger Electronics, Inc.: *See—*
McNett, John P.; and Mucaro, Sal, 4,995,844, Cl. 446-021.000.
Tilly, Bodo: *See—*
Rieger, Robert; and Tilly, Bodo, 4,995,694, Cl. 350-96.190.
Tinucci, Laura; and Platone, Edoardo, to Enitricerche S.p.A. Process for the catalytic hydroformylation of olefins. 4,996,366, Cl. 568-454.000.
Tinz, Reinhard: *See—*
Beicht, Bernd; Heinemann, Joachim; Keller, Frank; and Tinz, Reinhard, 4,995,433, Cl. 141-312.000.
Titze, Horst: *See—*
Pawelzik, Manfred; and Titze, Horst, 4,995,419, Cl. 137-316.000.
Tobisawa, Seiichi; Namiki, Takemasa; and Kawabe, Shigetoshi, to Konica Corporation. Coating apparatus. 4,995,339, Cl. 118-410.000.
Tobita, Tomoyuki; and Yamamoto, Yoshimi, to Hitachi, Ltd. Differential pressure transmitter. 4,995,266, Cl. 73-706.000.
Toda, Haruhiko: *See—*
Oda, Junichi; Amano, Masaki; Toda, Haruhiko; and Koyagi, Toshiyuki, 4,996,158, Cl. 435-280.000.
Tohda, Hiroyuki: *See—*
Tazawa, Kenji; Iwata, Akira; Horigome, Tomoki; and Tohda, Hiroyuki, 4,996,132, Cl. 430-286.000.
Toivola, Reijo J.; Karjalainen, Arto J.; Kurkela, Kauko O. A.; Soderwall, Marja-Liisa; Kangas, Lauri V. M.; Blanco, Guillermo L.; and Sundquist, Hannu K., to Farmos Group Ltd. Tri-phenyl alkane derivatives and their oestrogenic, anti-oestrogenic and progestanic uses. 4,996,225, Cl. 514-428.000.
Tojima, Akihiko, to Kabushiki Kaisha Toshiba. Address information registering/searching system in network system. 4,996,524, Cl. 340-825.020.
Tokai Carbon Co., Ltd.: *See—*
Nakada, Toshio; Takemura, Fumio; Sema, Yoshihito; and Kataoka, Kazuhito, 4,995,999, Cl. 252-62.550.
Tokico Ltd.: *See—*
Kobayashi, Kinzo; Nakayama, Shinichi; and Suzuki, Shigeo, 4,995,482, Cl. 188-73.100.
Tokuda, Kanji; Saeki, Yoshihiko; Sakamoto, Kiichiro; and Matsumoto, Fumio, to Fuji Photo Film Co., Ltd. Collating device. 4,996,558, Cl. 355-50.000.
Tokuhara, Masaharu: *See—*
Naito, Hidefumi; Sarugaku, Toshio; and Tokuhara, Masaharu, 4,996,595, Cl. 358-150.000.
Tokuhiro, Tomoya; Koibuchi, Nobutaka; Miyauchi, Teruhiko; Kikuchi, Koshin; Hirokawa, Jun; Yamashiro, Kunio; Nishizuka, Sakae; Watanabe, Ippei; Maruo, Shozo; Tsutsui, Yohichiro; and Ishikawa, Sadahito, to Shimizu Construction Co., Ltd.; and Shinmeiwa Industry Co., Ltd. Method of collecting wastes and system therefor. 4,995,765, Cl. 406-117.000.
Tokushuku, Nobuhiro: *See—*
Yanagihara, Hitoshi; and Tokushuku, Nobuhiro, 4,996,682, Cl. 369-275.400.
Tokyo Electric Co., Ltd.: *See—*
Haraga, Koichi; Takahama, Kazuhide; and Uchimura, Mitsuo, 4,996,539, Cl. 346-76.0PH.
Ogawa, Izumi; Kurihara, Kazuyoshi; Uchida, Seigo; and Nishijima, Takashi, 4,996,604, Cl. 358-474.000.
Tolbert, Thomas W.: *See—*
Cooke, William M.; Hendrix, James E.; and Tolbert, Thomas W., 4,996,099, Cl. 428-245.000.
Toles, Robert D.: *See—*
Sewell, Charles A.; and Toles, Robert D., 4,995,915, Cl. 134-22.140.
Tomczuk, Zygmunt: *See—*
Poa, David S.; Burris, Leslie; Steunenberg, Robert K.; and Tomczuk, Zygmunt, 4,995,948, Cl. 204-1.500.
Tomeoku, Hiroshi: *See—*
Kitamura, Masashi; Kobayashi, Takashi; Kakiuchi, Shunji; Yamaguchi, Kiyoshi; Tomeoku, Hiroshi; Maki, Naoki; Nakata, Jyoji; and Uno, Yasumichi, 4,996,496, Cl. 328-228.000.
Tomita, Kyoichi: *See—*
Umemoto, Teruo; Tomita, Kyoichi; Kawada, Kosuke; and Tomizawa, Ginjiro, 4,996,320, Cl. 546-9.000.
Tomizawa, Ginjiro: *See—*
Umemoto, Teruo; Tomita, Kyoichi; Kawada, Kosuke; and Tomizawa, Ginjiro, 4,996,320, Cl. 546-9.000.
Tomoda, Koji: *See—*
Kawai, Tatsundo; Ogura, Makoto; Tomoda, Koji; Ichihashi, Hiroo; Seitoh, Shinichi; Kuroda, Yasuo; and Noguchi, Hiroyuki, 4,996,606, Cl. 358-475.000.
Tomono, Hidemi: *See—*
Kobayashi, Sadao; Tomono, Hidemi; and Yoshida, Kazunobu, 4,995,286, Cl. 82-101.000.
Tomotsu, Norio: *See—*
Maezawa, Hiroshi; and Tomotsu, Norio, 4,996,338, Cl. 556-179.000.
Tomra Systems A/S: *See—*
Nordbryhn, Andreas, 4,996,440, Cl. 250-561.000.
Tomy Kogyo Co., Inc.: *See—*
Kashimoto, Kiyoshi, 4,995,606, Cl. 273-1.0GG.
Tone, Shoichi; and Kiriake, Masaharu, to Murata Kikai Kabushiki Kaisha. Steam setting system for spinning bobbin. 4,995,230, Cl. 57-281.000.
Tonoki, Ikuo: *See—*
Demura, Toshiaki; and Tonoki, Ikuo, 4,995,143, Cl. 16-357.000.
Tonouchi, Masayoshi: *See—*
Kobayashi, Takeshi; Tonouchi, Masayoshi; and Sakaguchi, Yoshiyuki, 4,996,191, Cl. 505-1.000.
Topel, Kenneth D. Quiver having a neck-gripping and alignment mechanism. 4,995,372, Cl. 124-25.500.
Toramoto, Hisao, to Hosiden Electronics Co., Ltd. Pin plug connector. 4,995,836, Cl. 439-675.000.
Torii, Nozomu, to Aisin Seiki Kabushiki Kaisha; and Aisin Hoyo Kabushiki Kaisha. Door lock apparatus. 4,995,653, Cl. 292-216.000.
Torres, Daniel L.; Gullikson, Darryl C.; Case, M. Bruce; and Neher, Ralph A., to Atlantic Richfield Company. Coke drum inlet line alignment device. 4,995,413, Cl. 137-1.000.
Torrington Research Company: *See—*
O'Connor, John F., 4,995,787, Cl. 416-228.000.

Tortorici, Frank J.: *See*—
Phan, Hieu D.; Carrier, Gary W.; Stockl, Rebecca R.; Tortorici, Frank J.; and Wulf, R. Gary, 4,996,252, Cl. 524-88.000.

Tosa, Takahumi: *See*—
Kobayashi, Takaaki; Tosa, Takahumi; Sato, Hiroyuki; Okada, Hiroyoshi; Miyake, Masao; and Mori, Kenji, 4,996,067, Cl. 426-96.000.

Toshiba Ceramics Co., Ltd.: *See*—
Ooya, Satoshi; Sugiura, Sadanobu; Kawashima, Teruhisa; and Kawamura, Toshio, 4,995,535, Cl. 222-607.000.

Toshiba Machine Co., Ltd.: *See*—
Tanaka, Katsuji, 4,996,434, Cl. 250-492.300.

Toshiba Silicone Co., Ltd.: *See*—
Ohkawa, Kazuhiro; and Yamazaki, Taro, 4,996,511, Cl. 338-114.000.
Saito, Kenji; and Kimura, Hiroshi, 4,996,257, Cl. 524-262.000.

Totani Giken Kogyo Co., Ltd.: *See*—
Totani, Mikio, 4,995,859, Cl. 493-204.000.

Totani, Mikio, to Totani Giken Kogyo Co., Ltd. Sheet material stacking apparatus. 4,995,859, Cl. 493-204.000.

Tovey, Geoffrey D.: *See*—
Carlin, Brian A. C.; Healey, John N. C.; Leonard, Graham S.; and Tovey, Geoffrey D., 4,996,222, Cl. 514-400.000.

Towers, Christine M.: *See*—
Bryan, Philip S.; Lambert, Patrick M.; Towers, Christine M.; and Jarrold, Gregory S., 4,996,003, Cl. 252-301.40F.

Toyama, Tadao; Kunichika, Kenji; Hishiki, Norio; and Nishida, Masahiro, to Fuji Photo Film Co., Ltd. Desensitizing gum lithographic plate finisher. 4,996,135, Cl. 430-309.000.

Toyama, Yoshikuni: *See*—
Ohashi, Masashi; Toyama, Yoshikuni; Kagiura, Kazuo; Maruyama, Hiroyoshi; Shiratori, Tatsuya; Shirai, Masanari; and Ando, Eiichi, 4,995,601, Cl. 271-127.000.

Toyko Ohka Kogyo Co. Ltd.: *See*—
Tazawa, Kenji; Iwata, Akira; Horigome, Tomoki; and Tohda, Hiroyuki, 4,996,132, Cl. 430-286.000.

Toyo Boseki Kabushiki Kaisha: *See*—
Matsui, Takeshi; Watanabe, Takehiko; Miyazaki, Katsunori; and Hayashi, Hiroo, 4,996,182, Cl. 503-200.000.
Yoshinaka, Yasuo; Kuze, Katsuaki; Isaka, Tsutomu; Yamashita, Toshihiro; Matsuyama, Yujiro; Nakamura, Koichiro; Matsunaga, Tsuyoshi; and Makimura, Osamu, 4,996,291, Cl. 528-272.000.

Toyo Hakka Kogyo Co., Ltd.: *See*—
Sakata, Isao; Nakajima, Susumu; Koshimizu, Koichi; Samejima, Natsuki; Inohara, Kazumi; Takata, Hiroyuki; Yamauchi, Hirohiko; Ueda, Nobuo; and Hazue, Masaaki, 4,996,312, Cl. 540-145.000.

Toyoda Koki Kabushiki Kaisha: *See*—
Yamashita, Tsuyoshi; Kobayashi, Goro; Nakamura, Hisanori; Shibata, Youichi; and Mori, Toshihiro, 4,996,683, Cl. 370-4.000.

Toyota Jidosha Kabushiki Kaisha: *See*—
Kamei, Eiichi; Namba, Hideaki; Ohba, Masahiro; Tanaka, Shinichiro; and Aoki, Keiji, 4,995,364, Cl. 123-442.000.
Santo, Toshiyasu, 4,995,633, Cl. 280-673.000.
Shinto, Hiroaki; Sakaguchi, Sumio; and Asagiri, Katuki, 4,995,638, Cl. 280-731.000.
Takada, Mitsuru; Itoh, Hiroshi; Takahashi, Tokuyuki; and Funahashi, Makoto, 4,995,284, Cl. 74-868.000.
Tate, Takao; Nakamura, Norihiko; Noguchi, Hiroshi; Kawagoe, Michio; Baika, Toyokazu; Kato, Kichiro; Kido, Yoshio; Hirose, Katsuhiko; Nihei, Hiroaki; and Masubuchi, Masahiko, 4,995,347, Cl. 123-65.0BA.
Yamashita, Tsuyoshi; Kobayashi, Goro; Nakamura, Hisanori; Shibata, Youichi; and Mori, Toshihiro, 4,996,683, Cl. 370-4.000.

Toyota Jishoda Kabushiki Kaisha: *See*—
Hyodo, Youichi; Muramatsu, Tadao; and Hattori, Takaji, 4,995,755, Cl. 403-133.000.

Tozawa, Noriyoshi: *See*—
Tanaka, Shinichi; Hori, Masayuki; and Tozawa, Noriyoshi, 4,996,572, Cl. 357-23.500.

Tranter, Inc.: *See*—
Mathur, Achint P., 4,995,455, Cl. 165-166.000.

Trapp, Horst: *See*—
Bott, Kaspar; Hoffmann, Herwig; Scheidmeir, Walter; and Trapp, Horst, 4,996,324, Cl. 546-339.000.

Traxler, John C., to HyperPower, Inc. Plasma arc transfer controller. 4,996,407, Cl. 219-121.540.

Trick, Robert E.: *See*—
Maerzke, James T.; and Trick, Robert E., 4,995,380, Cl. 128-79.000.

Trimble, Carroll O., to Action Products Marketing Corporation. Cast-in-place manhole liner apparatus. 4,995,584, Cl. 249-10.000.

Trudel, Paul;: *See*—
Desjardins, Pierre; Trudel, Paul;; and Leroux, Jean-Marc, 4,996,714, Cl. 382-3.000.

Tsai, Carlos. Bicycle wheel and the manufacturing method. 4,995,675, Cl. 301-63.0PW.

Tsaklakidis, Christos; Bosies, Elmar; Schultz, Michael; Haag, Rainer; Herrmann, Dieter; and Pahlke, Wulf, to Boehringer Mannheim GmbH. Imidazolidine derivatives as immunosuppressives. 4,996,219, Cl. 514-341.000.

Tsang, Kay: *See*—
Byers, Larry L.; Tsang, Kay; Scheuneman, James H.; and Svenkeson, Penny, 4,996,688, Cl. 371-16.500.

Tsao, Sylvia S.: *See*—
Guilinger, Terry R.; Kelly, Michael J.; Martin, Samuel B., Jr.; Stevenson, Joel O.; and Tsao, Sylvia S., 4,995,954, Cl. 204-129.750.

Tse, Kwok-Tuen: *See*—
Johnson, Calvin K.; Cooke, Richard C.; and Tse, Kwok-Tuen, 4,996,249, Cl. 523-144.000.

Tsubakimoto Chain Co.: *See*—
Kotegawa, Katsumi, deceased; Okuda, Yoshihiro; Uera, Masaru; and Miki, Hirofumi, 4,995,566, Cl. 242-77.200.
Suyama, Yasuyuki, 4,995,782, Cl. 414-732.000.
Takahashi, Toshio; Matsuno, Kazumasa; Morimoto, Masaru; and Ochiai, Fumio, 4,995,852, Cl. 474-91.000.

Tsuboi, Noboru, to Kabushiki Kaisha Kobe Seiko Sho. Rotary screw vacuum pump with controlled valve for lubrication/sealing fluid. 4,995,797, Cl. 418-84.000.

Tsuchiya, Yutaka: *See*—
Takahashi, Hironori; Aoshima, Shinichiro; and Tsuchiya, Yutaka, 4,996,475, Cl. 324-96.000.

Tsuda, Tokihiro: *See*—
Yoshida, Kinoto; Fujii, Morizumi; Tsuda, Tokihiro; Suda, Shigeo; Kodama, Osamu; Kuroe, Kazuro; Tanikawa, Takumi; Nishimura, Michihiko; and Munakata, Hideyuki, 4,995,932, Cl. 156-242.000.

Tsujihiro, Masami: *See*—
Okubo, Masayoshi; and Tsujihiro, Masami, 4,996,265, Cl. 525-242.000.

Tsujino, Toshio: *See*—
Soga, Kunio; Okada, Kazuo; Tanaka, Noriaki; Sogame, Morio; and Tsujino, Toshio, 4,995,193, Cl. 48-197.00R.

Tsukada, Masaaki: *See*—
Kai, Osamu; Tsukada, Masaaki; and Tachibana, Hiroshi, 4,995,497, Cl. 194-318.000.

Tsukada, Minoru; Tanaka, Kenji; and Iga, Yoshiro, to Green Cross Corporation. Fibrinolytic activity enhancer. 4,996,050, Cl. 424-94.200.

Tsukada, Toshihisa: *See*—
Kume, Hitoshi; Kamigaki, Yoshiaki; Adachi, Tetsuo; Tsukada, Toshihisa; Komori, Kazuhiro; Nishimoto, Toshiaki; Muto, Tadashi; and Koizumi, Toshiko, 4,996,571, Cl. 357-23.500.

Tsukamoto, Shin-ichi; Nagaoka, Hitoshi; Usuda, Shinji; Harada, Masatomi; and Tamura, Toshinari, to Yamanouchi Pharmaceutical Co., Ltd. Heterocyclic spiro compounds and methods for preparing the same. 4,996,210, Cl. 514-278.000.

Tsukaya, Takashi: *See*—
Inaba, Makoto; Hayashi, Masaaki; Hashiguchi, Toshihiko; Hibino, Hiroki; Sasa, Hiroyuki; Barlow, David E.; Ohshima, Yutaka; Ishihara, Kohichiro; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Klosterman, Frank; and Goodman, Jack, 4,995,396, Cl. 128-654.000.

Tsumiji, Akio: *See*—
Takahashi, Kaoru; Tsumiji, Akio; and Shutoku, Ryuji, 4,996,518, Cl. 340-518.000.

Tsumura & Co.: *See*—
Kimura, Masayuki; Hosaka, Kunio; Takeda, Shigehumi; and Mitsuhashi, Hiroshi, 4,996,331, Cl. 549-229.000.

Tsuruda, Hitoshi: *See*—
Ohmura, Keiji; Okuno, Sumio; Takeichi, Michifumi; Okazaki, Masato; and Tsuruda, Hitoshi, 4,995,321, Cl. 105-397.000.

Tsuruoka, Masaharu: *See*—
Koiwai, Hideo; Yamazaki, Junichi; Yoshino, Kunio; and Tsuruoka, Masaharu, 4,995,581, Cl. 248-480.000.

Tsuruoka, Shigeyoshi; and Hayashi, Saigiro, to Hoyu Bussan Kabushiki Kaisha. Apparatus for stocking golf clubs. 4,995,332, Cl. 118-66.000.

Tsutsui, Yohichiro: *See*—
Tokuhiro, Tomoya; Koibuchi, Nobutaka; Miyauchi, Teruhiko; Kikuchi, Koshin; Hirokawa, Jun; Yamashiro, Kunio; Nishizuka, Sakae; Watanabe, Ippei; Maruo, Shozo; Tsutsui, Yohichiro; and Ishikawa, Sadahito, 4,995,765, Cl. 406-117.000.

Tsutsumi, Kiyohide, to Mitsubishi Denki Kabushiki Kaisha. Supporting device for ultrasonic vibration assembly. 4,995,938, Cl. 156-580.100.

Tsuyoshi, Ikeda, to New Japan Chemical Co., Ltd. Composition comprising polyimide resin from diphenyl sulfone -3,3',4,4'-tetracarboxylic acid dianhydride. 4,996,293, Cl. 528-352.000.

Tuck, Clive D. S., to Alcan International Limited. Battery. 4,996,129, Cl. 429-194.000.

Tucker, Leslie R.; and Tucker, Robin. Gun lock. 4,995,180, Cl. 42-70.070.

Tucker, Robin: *See*—
Tucker, Leslie R.; and Tucker, Robin, 4,995,180, Cl. 42-70.070.

Tuckey, Charles H., to Walbro Corporation. Stratified air scavenging in two-stroke engine. 4,995,349, Cl. 123-65.0VB.

Turck, Werner; and Schumacher, Hans, to Werner Turck GmbH & Co., KG. Proximity switch for use in welding facilities. 4,996,408, Cl. 219-130.010.

Turnberg, Jay E., to United Technologies Corporation. Composite rotor blade. 4,995,788, Cl. 416-230.000.

Turnidge, Patrick A. Coronary angiography imaging system. 4,995,398, Cl. 128-668.000.

Turuta, Shizuo: *See*—
Ishino, Takashi; Hiyama, Isao; Nagano, Yousuke; Shikamori, Tamotu; Turuta, Shizuo; Kamano, Toshiyasu; and Ohsugi, Hiroshi, 4,995,247, Cl. 68-12.00R.

Tustison, Randal W.; Montanari, Dennis; Varitimos, Thomas; and diBenedetto, Bernard, to Raytheon Company. Impact resistant and tempered optical elements. 4,995,684, Cl. 350-1.600.

Tweedale, Colin R.: *See*—
Eling, Berend; and Tweedale, Colin R., 4,996,241, Cl. 521-107.000.
Tweedie, Judith A.: *See*—
Richeson, Donald E.; and Tweedie, Judith A., 4,996,269, Cl. 525-444.000.
Tye, Stephen: *See*—
Williams, Robert A.; and Tye, Stephen, 4,996,520, Cl. 340-662.000.
Tyree, Lewis, Jr.: *See*—
Kooy, Richard J.; Andrepont, John S.; Gyger, Roger F.; and Tyree, Lewis, Jr., 4,995,234, Cl. 60-648.000.
Tzikas, Athanassios, to Ciba-Geigy Corporation. Reactive disazo dyes containing fluoro-chloropyrimidyl groups and vinyl sulfonyl group. 4,996,304, Cl. 534-637.000.
TZN Forschungs-und Entwicklungszentrum Unterluss GmbH: *See*—
Loffler, Markus; and Braunsberger, Ulrich, 4,996,455, Cl. 310-12.000.
Ube Industries, Ltd.: *See*—
Matsuura, Ikuya; and Yoshida, Yasushi, 4,996,382, Cl. 585-500.000.
Soga, Kunio; Okada, Kazuo; Tanaka, Noriaki; Sogame, Morio; and Tsujino, Toshio, 4,995,193, Cl. 48-197.00R.
Uchida, Seigo: *See*—
Ogawa, Izumi; Kurihara, Kazuyoshi; Uchida, Seigo; and Nishijima, Takashi, 4,996,604, Cl. 358-474.000.
Uchida, Takashi: *See*—
Masukawa, Toyoaki; Uchida, Takashi; and Nakayama, Noritaka, 4,996,139, Cl. 430-558.000.
Uchimura, Mitsuo: *See*—
Haraga, Koichi; Takahama, Kazuhide; and Uchimura, Mitsuo, 4,996,539, Cl. 346-76.0PH.
Uchiyama, Kyoichi: *See*—
Okamoto, Yoshio; Nakamura, Yozo; Uchiyama, Kyoichi; Watanabe, Haruo; Kosuge, Tokuo; Onishi, Akira; Terasaki, Akashi; Ando, Hiroyuki; and Hamashima, Eiji, 4,995,559, Cl. 239-493.000.
Udagawa, Tsunekazu; and Inamura, Susumu, to Ishikawa Gasket Co., Ltd. Steel laminate gasket with wide sealing area. 4,995,624, Cl. 277-235.00B.
Ude, Werner: *See*—
Krieg, Manfred; Rau, Norbert; and Ude, Werner, 4,996,109, Cl. 428-304.400.
Ueda, Nobuo: *See*—
Sakata, Isao; Nakajima, Susumu; Koshimizu, Koichi; Samejima, Natsuki; Inohara, Kazumi; Takata, Hiroyuki; Yamauchi, Hirohiko; Ueda, Nobuo; and Hazue, Masaaki, 4,996,312, Cl. 540-145.000.
Ueda, Osamu: *See*—
Goldowsky, Michael P.; Hisano, Teiji; Karidis, John P.; Shibuya, Hiromi; and Ueda, Osamu, 4,995,744, Cl. 400-157.200.
Ueno, Atsushi: *See*—
Nomura, Noboru; Ueno, Atsushi; Hashimoto, Kazuhiko; and Kinoshita, Satoshi, 4,996,123, Cl. 430-20.000.
Ueno, Masaji, to Kabushiki Kaisha Toshiba. Output circuit having high speed operation and low power dissipation. 4,996,449, Cl. 307-446.000.
Ueno, Masatoshi: *See*—
Nanri, Seiji; Ueno, Masatoshi; and Ohno, Takashi, 4,996,560, Cl. 355-91.000.
Ueno, Shigeto: *See*—
Tajima, Noriyuki; Ueno, Shigeto; and Sano, Tetsuhiro, 4,995,748, Cl. 400-691.000.
Uera, Masaru: *See*—
Kotegawa, Katsumi, deceased; Okuda, Yoshihiro; Uera, Masaru; and Miki, Hirofumi, 4,995,566, Cl. 242-77.200.
Uetsuki, Tadao, to Matsushita Electric Works, Ltd. Variable color lighting device. 4,996,465, Cl. 315-358.000.
Umemoto, Teruo; Tomita, Kyoichi; Kawada, Kosuke; and Tomizawa, Ginjiro, to Sagami Chemical Research Center. N-fluoropyridinium salt and process for preparing same. 4,996,320, Cl. 546-9.000.
Unilever Patent Holdings B.V.: *See*—
de Hey, Johannes T.; Renes, Harrie; and Visser, Jan, 4,996,069, Cl. 426-248.000.
Garvey, Michael J.; Griffiths, Ian C.; and Thompson, Ian, 4,995,995, Cl. 252-28.000.
Union Oil Company of California: *See*—
Denney, Michael L.; Withrow, Shelby M.; and Delancey, John M., Sr., 4,995,896, Cl. 65-260.000.
Occelli, Mario L., 4,995,963, Cl. 208-111.000.
Unisys Corporation: *See*—
Byers, Larry L.; Tsang, Kay; Scheuneman, James H.; and Svenkeson, Penny, 4,996,688, Cl. 371-16.500.
Wilson, Mark L., 4,995,693, Cl. 350-96.180.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in her Britannic Majesty's Government of the: *See*—
Daniels, Brian W., 4,995,165, Cl. 33-361.000.
U.S. Controls Corp.: *See*—
Schantz, Spencer; Janz, Ronald J.; Christiansen, Gary; and Sager, Steven, 4,995,653, Cl. 292-201.000.
United States of America
Agriculture: *See*—
Cadmus, Martin C.; and Slodki, Morey E., 4,996,153, Cl. 435-209.000.
Carter, Jeanne K.; and Silva, Robert F., 4,996,152, Cl. 435-172.300.
Inglett, George F., 4,996,063, Cl. 426-21.000.
Air Force: *See*—
Ranon, Peter M., 4,996,494, Cl. 328-65.000.
Army: *See*—
Brown, Donald G.; and Miyata, Gary T., 4,995,644, Cl. 285-41.000.
Gupta, Neelam, 4,996,430, Cl. 250-339.000.
Mon, George, 4,995,269, Cl. 73-861.220.
Commerce: *See*—
May, Peter T.; Strauch, Richard G.; and Weber, Bob L., 4,996,533, Cl. 342-108.000.
Energy: *See*—
Beer, Stephen K.; and Pratt, Harold R., II, 4,996,483, Cl. 324-321.000.
Deason, Vance A.; Johnson, John A.; and Telschow, Kenneth L., 4,995,260, Cl. 73-632.000.
Guilinger, Terry R.; Kelly, Michael J.; Martin, Samuel B., Jr.; Stevenson, Joel O.; and Tsao, Sylvia S., 4,995,954, Cl. 204-129.750.
Hawsey, Robert A.; and Bailey, J. Milton, 4,996,457, Cl. 310-268.000.
Kotter, Dale K.; and Rankin, Richard A., 4,996,531, Cl. 341-157.000.
Meikrantz, David H.; Bourne, Gary L.; McFee, John N.; Burdge, Bradley G.; and McConnell, John W., Jr., 4,995,916, Cl. 134-22.160.
Poa, David S.; Burris, Leslie; Steunenberg, Robert K.; and Tomczuk, Zygmunt, 4,995,948, Cl. 204-1.500.
Scott, Charles D.; Woodward, Charlene A.; and Byers, Charles H., 4,995,985, Cl. 210-679.000.
Sharp, Donald J.; Vernon, Milton E.; and Wright, Steven A., 4,995,947, Cl. 204-1.500.
White, Terry L., 4,996,403, Cl. 219-10.55B.
Wiggins, Rodney K., 4,995,420, Cl. 137-360.000.
Interior: *See*—
McKeown, Mark H.; and Beason, Steven C., 4,996,547, Cl. 354-81.000.
National Aeronautics and Space Administration: *See*—
Adamovsky, Grigory, 4,995,697, Cl. 350-96.290.
Barney, Richard D.; and Magner, Thomas J., 4,995,700, Cl. 350-266.000.
Reed, Wilmer H., III; and Gold, Ronald R., 4,995,272, Cl. 73-865.600.
Navy: *See*—
Becker, Earl M., Jr.; and Miller, Allen, 4,996,525, Cl. 340-825.310.
Chu, Tak-Kin, 4,996,579, Cl. 357-30.000.
Kabacoff, Lawrence T., 4,996,692, Cl. 372-26.000.
Lebovits, Alexander; Yaeger, William L.; Mercer, William B.; and Dapp, Timothy L., 4,996,261, Cl. 525-131.000.
U.S. Philips Corp.: *See*—
Flipse, Abraham R.; Kay, Peter J.; and Rozendaal, Ewoud, 4,996,023, Cl. 419-12.000.
Muller, Torsten, 4,995,779, Cl. 414-27.000.
Rosenthal, Manfred, 4,995,746, Cl. 400-616.200.
Ruigrok, Jacobus J. M.; Zieren, Victor; Enz, Ulrich E.; and Druyvesteyn, Willem F., 4,996,621, Cl. 360-126.000.
Schneyderberg Van Der Zon, Ingrid A. C., 4,996,645, Cl. 364-449.000.
Steers, Michel; Hazan, Jean-Pierre; and Delmas, Gilles, 4,995,244, Cl. 62-155.000.
Van de Gang, Harold P., 4,995,978, Cl. 210-474.000.
Van Houten, Hendrik; and Van Wees, Bart J., 4,996,570, Cl. 357-22.000.
United Technologies Corporation: *See*—
Anafi, David; Mitchell, John H.; and Schall, Harold B., 4,996,412, Cl. 250-201.900.
Cox, Roger G.; Yeager, Michael W.; and Flake, Lance L., 4,996,661, Cl. 364-748.000.
Morey, William W., 4,996,419, Cl. 250-227.180.
Turnberg, Jay E., 4,995,788, Cl. 416-230.000.
Wheeler, Jerry W.; and Wiley, Walter H., III, 4,995,786, Cl. 415-148.000.
Univ. of Colo. Foundation, Inc.: *See*—
May, Peter T.; Strauch, Richard G.; and Weber, Bob L., 4,996,533, Cl. 342-108.000.
University of British Columbia, The: *See*—
Cullen, William R.; Fryzuk, Michael D.; James, Brian R.; Kang, Guo-Jun; Kutney, James P.; Spogliarich, Roberto; and Thorburn, Ian S., 4,996,361, Cl. 564-304.000.
University of California, The Regents of the: *See*—
Hewitt, Charles W.; and Black, Kirby S., 4,996,193, Cl. 514-11.000.
University of Cincinnati: *See*—
Zimmer, Hans W.; Martelo, Orlando J.; and Franco, Robert S., 4,996,227, Cl. 514-444.000.
University of Glasgow, The University Court of the: *See*—
Damato, Bertil E., 4,995,717, Cl. 351-224.000.
University of Hawaii: *See*—
Moore, Richard E.; Furusawa, Eiichi; Norton, Ted R.; Patterson, Gregory M. L.; and Mynderse, Jon S., 4,996,229, Cl. 514-450.000.
Uno, Yasumichi: *See*—
Kitamura, Masashi; Kobayashi, Takashi; Kakiuchi, Shunji; Yamaguchi, Kiyoshi; Tomeoku, Hiroshi; Maki, Naoki; Nakata, Jyoji; and Uno, Yasumichi, 4,996,496, Cl. 328-228.000.
Unozawa - Gumi Iron Works, Ltd.: *See*—
Kambe, Shigeharu; and Higuchi, Tutomu, 4,995,796, Cl. 418-9.000.

Untawale, Govind G.: *See*—
Schildknecht, Eugene G.; and Untawale, Govind G., 4,996,198, Cl. 514-157.000.
UOP: *See*—
Gortsema, Frank P.; McCauley, John R.; Pellet, Regis J.; Miller, James G.; and Rabo, Jule A., 4,995,964, Cl. 208-112.000.
McCulloch, Beth; and Gatter, Michael G., 4,996,380, Cl. 570-211.000.
Skeels, Gary W., 4,996,034, Cl. 423-328.000.
Upjohn Company, The: *See*—
Gall, Martin; and Higuchi, Robert I., 4,996,318, Cl. 544-295.000.
Whitman, Charles R.; and Dougherty, John J., Jr., 4,995,222, Cl. 53-510.000.
Urai, Muneharu, to Tachi-S Co., Ltd. Method of making a seat. 4,995,926, Cl. 156-78.000.
Urayama, Kiyoshi; and Ozawa, Kazuo, to Sony Corporation. Cassette reel. 4,995,565, Cl. 242-71.800.
Urushihara, Tomonori: *See*—
Yokoyama, Junichi; Urushihara, Tomonori; Itoh, Teruyuki; and Fujii, Hiroyuki, 4,995,359, Cl. 123-188.00M.
Usuda, Shinji: *See*—
Tsukamoto, Shin-ichi; Nagaoka, Hitoshi; Usuda, Shinji; Harada, Masatomi; and Tamura, Toshinari, 4,996,210, Cl. 514-278.000.
Valentini, Luigi; and Ceschel, Giancarlo, to Phidea S.P.A. Inhaler with regular complete emptying of the capsule. 4,995,385, Cl. 128-203.210.
Valeo: *See*—
Auvity, Michel; and Chesnier, Patrice, 4,995,554, Cl. 236-51.000.
Bertin, Patrice; and Sevennec, Yvon, 4,995,488, Cl. 192-1.100.
Valeo Thermique Moteur Hutchinson: *See*—
Renault, Christophe, 4,995,449, Cl. 165-76.000.
Van de Gang, Harold P., to U.S. Philips Corp. Holder for inclining a coffee cartridge. 4,995,978, Cl. 210-474.000.
van den Haak, Rob. Anchor with cross connection. 4,995,326, Cl. 114-301.000.
van der Drift, Ernst; and Kapaan, Hendrikus J., to SKF Industrial Trading and Development Company B.V. Homokinetic coupling having a guiding device having a radial spring force action. 4,995,850, Cl. 464-143.000.
Van Der Huizen, Adriaan A., to Shell Oil Company. Anionic polymerization catalyst compositions. 4,996,273, Cl. 526-177.000.
van der Lijn, Joost; and Van Thoor, Bernardus M., to Douwe Egberts Koninklijke Tabaksfabriek-Koffiebranderijen-Theehandel N.V. Disposable filter cartridge, whether or not combined with a water reservoir. 4,995,310, Cl. 99-295.000.
Vandervaart, Gerry, to Kool-Fire Limited. High efficiency heat exchanger. 4,995,241, Cl. 62-238.700.
Van de Walle, Richard H., to Martin Marietta Magnesia Specialties Inc. Molasses-free chemically reactive binder for animal feed. 4,996,065, Cl. 426-72.000.
Vandoninck, Alfons, to Jaico C.V., Cooperatieve Vennootschap. Pressure capsule for spray can, and spray can which utilizes such a capsule. 4,995,533, Cl. 222-54.000.
Vandorpe, John, to N.V. Bekaert S.A. Measurement of the position of an elongated element. 4,996,491, Cl. 324-644.000.
van Driessche, Petrus J. D. M., to Akzo N.V. Separator for cell-containing liquids. 4,995,967, Cl. 210-94.000.
Van Houten, Hendrik; and Van Wees, Bart J., to U.S. Philips Corp. Semiconductor structure having a conductive channel. 4,996,570, Cl. 357-22.000.
Van Possen, Don B.: *See*—
Zawaski, Michael J.; and Van Possen, Don B., 4,995,620, Cl. 277-25.000.
Vansteelant, Marc G., to Ford New Holland, Inc. Bale wrapping control apparatus for round balers. 4,995,216, Cl. 53-64.000.
Van Thoor, Bernardus M.: *See*—
van der Lijn, Joost; and Van Thoor, Bernardus M., 4,995,310, Cl. 99-295.000.
Van Wees, Bart J.: *See*—
Van Houten, Hendrik; and Van Wees, Bart J., 4,996,570, Cl. 357-22.000.
Varian Associates, Inc.: *See*—
Anderson, Robert L.; and Helmer, John C., 4,995,958, Cl. 204-298.200.
Varitimos, Thomas: *See*—
Tustison, Randal W.; Montanari, Dennis; Varitimos, Thomas; and diBenedetto, Bernard, 4,995,684, Cl. 350-1.600.
Vasiliev, Vsevolod V.: *See*—
Paton, Boris E.; Vasiliev, Vsevolod V.; Bogdanovsky, Valentin A.; Shelekhov, Konstantin V.; Gavva, Viktor M.; Bigdash, Vladimir D.; Tabunschik, Ivan A.; and Ilchishin, Andrei P., 4,996,409, Cl. 219-130.010.
Vega Automation: *See*—
Boisseau, Jean L., 4,995,784, Cl. 414-786.000.
Veneziano, Larry D.: *See*—
Berkebile, Donald C.; Lee, Donald M.; Veneziano, Larry D.; Lauer, Joseph J.; Booth, Roy E.; and Hettinger, William P., 4,996,037, Cl. 423-447.400.
Venn, Peter, to Gebr. Happich GmbH. Brightening method. 4,995,951, Cl. 204-129.950.
Verbik, Robert M., to MPC, Metal Process Control A.B. Slag stopping plug for tap holes of metal furnaces containing molten material. 4,995,594, Cl. 266-272.000.
Vereinigte Aluminum Werke A.G.: *See*—
Behdorf, Hans; Singe, Thomas; and Sollner, Gerhardt, 4,996,095, Cl. 428-215.000.
Verlander, Michael: *See*—
Melmon, Kenneth L.; Goodman, Murray; Khan, Manzoor M.; Marr-Leisy, Debra; and Verlander, Michael, 4,996,221, Cl. 514-399.000.
Vermes, Sheldon A.; Botts, David M.; and Peterson, Charles A., to Water Technologies Corporation. Water purification straw. 4,995,976, Cl. 210-266.000.
Vernieres, Jean-Claude: *See*—
Mendes, Etienne; Vernieres, Jean-Claude; Simiaud, Jacques; and Keane, Peter E., 4,996,213, Cl. 514-300.000.
Vernon, Milton E.: *See*—
Sharp, Donald J.; Vernon, Milton E.; and Wright, Steven A., 4,995,947, Cl. 204-1.500.
Verret, Douglas P.: *See*—
Brighton, Jeffrey E.; and Verret, Douglas P., 4,996,133, Cl. 430-313.000.
Versteegh, Christian W., to Heineken Technisch Beheer B.V. Settling device for separating trub from hot wort. 4,995,979, Cl. 210-521.000.
Vianova Kunstharz, A.G.: *See*—
Awad, Rami-Raimund; Dworak, Gert; Zuckert, Bertram; and Weger, Walter, 4,996,250, Cl. 523-500.000.
Victoria University of Manchester, The: *See*—
Rees, John M. H.; Robinson, Brian; and Cox, Brian, 4,996,223, Cl. 514-410.000.
Virginia Tech Intellectual Properties, Inc.: *See*—
Gibson, Harry W.; and Jois, Yajnanarayana H. R., 4,996,346, Cl. 558-392.000.
Visser, Jan: *See*—
de Hey, Johannes T.; Renes, Harrie; and Visser, Jan, 4,996,069, Cl. 426-248.000.
VLSI Technology, Inc.: *See*—
Samad, Muhammad A., 4,996,689, Cl. 371-22.200.
VM Motori S.P.A.: *See*—
Brighigna, Mario, 4,995,362, Cl. 123-365.000.
Voest-Alpine Industrieanlagenbau Gesellschaft m.b.H.: *See*—
Pirklbauer, Wilfried, 4,995,907, Cl. 75-561.000.
Vogei, Gerald J.: *See*—
O'Brien, Michael J.; Spence, Jean E.; Skiff, Ronald H.; Vogel, Gerald J.; and Prasad, Ravi, 4,996,317, Cl. 544-274.000.
Voit, Karl, to Voit, Michael GmbH. Apparatus for glazing articles of earthenware or porcelain. 4,995,331, Cl. 118-46.000.
Voit, Michael GmbH: *See*—
Voit, Karl, 4,995,331, Cl. 118-46.000.
Voles, Roger, to Thorn Emi Electronics Limited. Thermal imaging device. 4,996,428, Cl. 250-332.000.
von Borcke, Wulff-Eckard; and Meyerling, Wilfried. to Mannesmann Aktiengesellschaft. Device for the surface cleaning of a hot deformed pipe end. 4,995,201, Cl. 51-411.000.
von Hackewitz, Friedrich-Wilhelm. Stringed frame with adjustable tensioning. 4,995,608, Cl. 273-73.00E.
von Rybinski, Wolfgang; and Koester, Rita, to Henkel Kommanditgesellschaft auf Aktien. Surfactant mixtures as collectors for the flotation of non-sulfidic ores. 4,995,998, Cl. 252-61.000.
von Schuckmann, Alfred, to Pohl GmbH & Co. KG. Stopper for infusion and transfusion bottles. 4,995,521, Cl. 215-249.000.
Vorsmann, Franz. Rolling shutter for wall or roof openings, especially in connection with turnable roof window. 4,995,440, Cl. 160-32.000.
VSI Corporation: *See*—
Warmington, John H., 4,995,777, Cl. 411-361.000.
W. L. Gore & Associates, Inc.: *See*—
Fischer, Paul, 4,996,097, Cl. 428-220.000.
Wachi, Hiroshi: *See*—
Kajiwara, Ryoichi; Funamoto, Takao; Kato, Mituo; Wachi, Hiroshi; and Shida, Tomohiko, 4,996,589, Cl. 357-82.000.
Wada, Noriyuki; and Yamanaka, Satoshi, to NOK Corporation. Sealing device for reciprocating member. 4,995,623, Cl. 277-208.000.
Waehner, Glenn C., to American Dynamics Corporation. Cable compensation circuit. 4,996,497, Cl. 330-151.000.
Waggoner, Richard L., to Alumax Inc. Roof ventilating apparatus. 4,995,308, Cl. 98-37.000.
Wagner, Barry L.: *See*—
Wright, Danny W.; and Wagner, Barry L., 4,996,378, Cl. 570-164.000.
Wagner, Helmar R., to Blendax GmbH. Toothpaste. 4,996,042, Cl. 424-54.000.
Wakabayashi, Masaru: *See*—
Kanemitsu, Norio; Tabata, Yoshio; and Wakabayashi, Masaru, 4,996,603, Cl. 358-462.000.
Wakabayashi, Shigeru; Saijo, Yoshihiro; Yamane, Yoshitaka; and Fujikawa, Yasuji, to Shikoku Kakoki Co., Ltd. Apparatus for filling specified amount of liquid. 4,995,431, Cl. 141-116.000.
Walbro Corporation: *See*—
Tuckey, Charles H., 4,995,349, Cl. 123-65.0VB.
Waldron, William E.: *See*—
Abel, Alan D.; Waldron, William E.; and Wells, Theodore F., 4,995,889, Cl. 55-21.000.
Walker, Grant W., to Spin-Alizer Corporation. Process for manufacturing practice golf ball. 4,995,613, Cl. 273-183.00C.
Wallace Computer Services, Inc.: *See*—
Juszak, Joseph J.; and Poplawski, John R., 4,995,642, Cl. 283-105.000.
Wallow, Peter, to Rheinmetall GmbH. Projectile equipped with guide fins. 4,995,573, Cl. 244-3.240.
Walls, W. Alan; Estes, Elvin; Manifold, Steve M.; Spann, Michael L.; and Gully, John H., to Board of Regents University of Texas System.

Methods for making reinforced composite flywheels and shafts. 4,996,016, Cl. 264-229.000.

Wallschlaeger, Gunnar J., to Lip-Prints, Inc. Cosmetic sample applicator and method of construction. 4,995,408, Cl. 132-320.000.

Walter Graf u.Co. GmbH & Co.: *See—*
Knodel, Erich, 4,995,532, Cl. 222-43.000.

Walther, Gerhard: *See—*
Weber, Karl-Heinz; Walther, Gerhard; Schneider, Claus; Hinzen, Dieter; Kuhn, Franz J.; and Lehr, Erich, 4,996,224, Cl. 514-424.000.

Wandel & Goltermann GmbH & Co.: *See—*
Rudolph, Georg, 4,996,699, Cl. 377-49.000.

Wang, Chun T.; and Scanlon, Robert H., to Teledyne Industries, Inc. Preparation process for coextrusion billets with multiple metallic cylindrical layers. 4,995,548, Cl. 228-131.000.

Wang Laboratories, Inc.: *See—*
Cooper, James L.; and San Soucie, Marc D., 4,996,662, Cl. 364-900.000.

Wang, Zhao Z.; and Ong, Nai-Phuan, to Princeton University. Flux method for producing crystals of superconducting $YBa_2Cu_3O_7$. 4,996,186, Cl. 505-1.000.

Ward, Allan, to F Muller Pty Limited. Drop-in refrigeration unit. 4,995,243, Cl. 62-298.000.

Ward, John B.: *See—*
Sutherland, Derek R.; Ramsay, Michael V. J.; Ward, John B.; Porter, Neil; Noble, Hazel M.; Fletton, Richard A.; and Noble, David, 4,996,228, Cl. 514-450.000.

Wardlaw, Russell, to Cookson Company, The. Release mechanism and method. 4,995,651, Cl. 292-201.000.

Warmington, John H., to VSI Corporation. Fastener with self-retaining collar. 4,995,777, Cl. 411-361.000.

Warner-Lambert Co.: *See—*
Bergmeier, Stephen C.; Kester, Jeffrey A.; Moos, Walter H.; Tecle, Haile; and Thomas, Anthony J., 4,996,201, Cl. 514-212.000.
Malone, Thomas C.; and Sircar, Jagadish C., 4,996,319, Cl. 544-330.000.

Warnicki, Joseph W.; Rehkopf, Paul G.; Cambier, James L.; and Strods, Salvins J., to Par Technology Corporation. Method and apparatus for obtaining the topography of an object. 4,995,716, Cl. 351-212.000.

Warshaw, Thelma G.; and Horowitz, Jacob. Infrared treatment for psoriasis. 4,996,046, Cl. 424-78.000.

Warwick, Dennis J.: *See—*
Lundstrom, Robert W.; Sannel, Benjamin H.; and Warwick, Dennis J., 4,995,501, Cl. 198-341.000.

Wasco Products, Inc.: *See—*
Sampson, Robert; and Flanigan, Sean, 4,995,208, Cl. 52-200.000.

Washington University: *See—*
Ackerman, Joseph J. H.; and Chen, Wei, 4,996,481, Cl. 324-318.000.
Destouet, Judy M.; Eichling, John O.; Gilula, Louis A.; Monsees, Barbara S.; and Young, Vernon L., 4,995,882, Cl. 623-8.000.

Watanabe, Azuma: *See—*
Yoshioka, Takeo; Chida, Noritaka; Watanabe, Azuma; Fukagawa, Yasuo; and Ishikura, Tomoyuki, 4,996,314, Cl. 540-364.000.

Watanabe, Haruo: *See—*
Okamoto, Yoshio; Nakamura, Yozo; Uchiyama, Kyoichi; Watanabe, Haruo; Kosuge, Tokuo; Onishi, Akira; Terasaki, Akashi; Ando, Hiroyuki; and Hamashima, Eiji, 4,995,559, Cl. 239-493.000.

Watanabe, Hitoshi: *See—*
Saito, Osamu; Kamezaki, Hisamitsu; Suenaga, Masashi; Nagai, Ryo; Iuchi, Shinichiro; Watanabe, Hitoshi; and Fujiwara, Hideo, 4,996,089, Cl. 428-64.000.

Watanabe, Ippei: *See—*
Tokuhiro, Tomoya; Koibuchi, Nobutaka; Miyauchi, Teruhiko; Kikuchi, Koshin; Hirokawa, Jun; Yamashiro, Kunio; Nishizuka, Sakae; Watanabe, Ippei; Maruo, Shozo; Tsutsui, Yohichiro; and Ishikawa, Sadahito, 4,995,765, Cl. 406-117.000.

Watanabe, Michihiro: *See—*
Nagata, Tatsuya; Watanabe, Michihiro; Hara, Eiichi; and Yamada, Takehiko, 4,996,438, Cl. 250-211.00R.

Watanabe, Shigeyoshi: *See—*
Endoh, Tetsuo; Shirota, Riichiro; Momodomi, Masaki; Tanaka, Tomoharu; Masuoka, Fujio; and Watanabe, Shigeyoshi, 4,996,669, Cl. 365-185.000.

Watanabe, Takehiko: *See—*
Matsui, Takeshi; Watanabe, Takehiko; Miyazaki, Katsunori; and Hayashi, Hiroo, 4,996,182, Cl. 503-200.000.

Watanabe, Taketoshi: *See—*
Tate, Takuo; Watanabe, Taketoshi; and Nagura, Hiroyuki, 4,995,428, Cl. 139-383.00A.

Watanabe, Yasushi: *See—*
Saito, Mitsuru; Matsumora, Satoru; and Watanabe, Yasushi, 4,996,005, Cl. 252-512.000.

Watanabe, Yoshihisa: *See—*
Nakachi, Takeshi; Hata, Akio; and Watanabe, Yoshihisa, 4,996,272, Cl. 526-62.000.

Watanuki, Kazuo: *See—*
Matsuda, Hideo; Fujiwara, Takashi; Yokota, Yoshio; Kitagawa, Mitsuhiko; Iwasaki, Masami; and Watanuki, Kazuo, 4,996,586, Cl. 357-74.000.

Watarai, Shinichi; Yasuda, Megumi; Hoki, Yoji; and Inoue, Makoto, to Fujitsu Limited. Method of controlling fuser unit of image forming apparatus. 4,996,567, Cl. 355-290.000.

Watase, Shinichiro: *See—*
Mitsui, Yasuhiro; Hasumi, Keiji; Watase, Shinichiro; Kuriyama, Katsumi; and Nakano, Kazuo, 4,996,422, Cl. 250-281.000.

Water Technologies Corporation: *See—*
Vermes, Sheldon A.; Botts, David M.; and Peterson, Charles A., 4,995,976, Cl. 210-266.000.

Watkins, Bruce J.; and DeBerry, Blake T., to Dril-Quip, Inc. Weil apparatus and method. 4,995,464, Cl. 166-382.000.

Watts, Craig L. Automotive parts washer utilizing a volatile cleaning solution. 4,995,409, Cl. 134-58.00R.

Wayne, Mark. Combination hoodscoop and tachometer. 4,996,442, Cl. 307-10.100.

Weaver, Robert C.; and Semion, Robert, to Weaver, Robert C.; Semion, Robert; Imbt, John H.; and Gingrich, Marlin K. Slidable truck cover assembly. 4,995,663, Cl. 296-100.000.

Weaver, Steven K., to Radon Control, Inc. Radon gas exhaust system. 4,995,309, Cl. 98-42.070.

Webb, Norval E.; and Hammer, Gregory V., to Merrell Dow Pharmaceuticals Inc. Pharmaceutical composition for piperidinoalkanol-decongestant combination. 4,996,061, Cl. 424-475.000.

Weber, Bob L.: *See—*
May, Peter T.; Strauch, Richard G.; and Weber, Bob L., 4,996,533, Cl. 342-108.000.

Weber, Friedrich: *See—*
Schill, Jurgen; Heene, Hans F.; Stahl, Rainer; and Weber, Friedrich, 4,995,790, Cl. 417-360.000.

Weber, Harold J. Partially flooded gas appliance safety shut-off method and apparatus. 4,995,415, Cl. 137-1.000.

Weber, Jurgen; Kampmann, Detlef; and Kniep, Claus, to Hoechst Aktiengesellschaft. Process for the preparation of tertiary N, N-dimethylamines. 4,996,316, Cl. 544-1.000.

Weber, Karl-Heinz; Walther, Gerhard; Schneider, Claus; Hinzen, Dieter; Kuhn, Franz J.; and Lehr, Erich, to Boehringer Ingelheim KG. 1-benzyl-4- or 5-pyrrolidinomethyl-pyrrolidin-2-ones and nootropic method of use thereof. 4,996,224, Cl. 514-424.000.

Weber, Michael J.; and Grant, Stuart D., to Goodyear Tire & Rubber Company, The. Multi-chambered pneumatic tire and wheel assembly having an inner tire and an outer tire. 4,995,438, Cl. 152-518.000.

Webster, David F.: *See—*
Lang, Stephen M.; and Webster, David F., 4,995,382, Cl. 128-156.000.

Webster, Harold F.; Neugebauer, Constantine A.; and Burgess, James F., to General Electric Company. Enhanced direct bond structure. 4,996,116, Cl. 428-627.000.

Wechsler, Lawrence I. Aquarium-terrarium tank. 4,995,334, Cl. 119-5.000.

Weger, Walter: *See—*
Awad, Rami-Raimund; Dworak, Gert; Zuckert, Bertram; and Weger, Walter, 4,996,250, Cl. 523-500.000.

Weidler, Charles H., to AMP Incorporated. Connector for mating blade-shaped members. 4,995,814, Cl. 439-61.000.

Weidmann, Werner; and Tiefenbacher, Rainer, to Daimler-Benz AG. Air ducting system for cooling air in the front end of a motor vehicle. 4,995,447, Cl. 165-44.000.

Weingarten, Jean M. S.: *See—*
Cornette, Holley M.; and Weingarten, Jean M. S., 4,995,456, Cl. 166-51.000.

Weisenbarger, Gale M.; and Moran, John C. Magnetic fluid conditioner. 4,995,425, Cl. 137-827.000.

Weisenthal, Larry M., to Oncotech Incorporated. Method for detecting immune-mediated cytotoxicity. 4,996,145, Cl. 435-7.230.

Weisser, Harald: *See—*
Zaehner, Hans; Bernhard, Konrad; and Weisser, Harald, 4,996,156, Cl. 435-252.500.

Welbilt Corporation: *See—*
Delau, William D.; Garman, James; and Keith, Kevin, 4,995,313, Cl. 99-467.000.

Welles, Franklin G. Dripless saucer. 4,995,524, Cl. 220-23.830.

Wells, Robert L., Jr.: *See—*
Hine, Nathan P.; and Wells, Robert L., Jr., 4,995,940, Cl. 156-629.000.

Wells, Theodore F.: *See—*
Abel, Alan D.; Waldron, William E.; and Wells, Theodore F., 4,995,889, Cl. 55-21.000.

Wells, William L. Cutting instrument improvement for X-Y plotter. 4,996,651, Cl. 364-520.000.

Werner, Thomas: *See—*
Engelhardt, Gunther; Lohrmann, Gerhard; and Werner, Thomas, 4,995,747, Cl. 400-625.000.

Werner Turck GmbH & Co., KG: *See—*
Turck, Werner; and Schumacher, Hans, 4,996,408, Cl. 219-130.010.

West, Robert C.: *See—*
Iwahara, Takahisa; and West, Robert C., 4,996,341, Cl. 556-406.000.

Western Michigan University, The Board of Trustees of: *See—*
Easwaran, Jay, 4,995,443, Cl. 164-34.000.

Western Temco, Inc.: *See—*
Jacquot, William E.; Tettman, Richard L.; and Davis, Melvin D., 4,995,975, Cl. 210-266.000.

Westinghouse Electric Corp.: *See—*
Bhatt, Pankaj N.; and Blaushild, Ronald M., 4,996,018, Cl. 376-203.000.
Cameron, Frank L.; and Smith, George A., 4,995,886, Cl. 29-623.000.
Hopkins, Brian M., 4,996,593, Cl. 358-101.000.
Howell, David A.; Hydeman, Jeffrey E.; Slater, Jeffrey L.; Bodnar, Richard J.; Golick, Leonard R.; Sekera, Robert S.; and Roth, Charles H., Jr., 4,995,158, Cl. 29-723.000.
Mallick, George T., Jr., 4,996,472, Cl. 324-71.600.

McKee, Jere L.; Thomas, Glenn R.; Gula, Lance; and Beatty, William E., Jr., 4,996,507, Cl. 335-195.000.
Sherwin, Gary W.; Kovach, Edward E.; and Schmidt, Albert L., 4,995,392, Cl. 128-639.000.
Thompson, Stephen C., 4,996,674, Cl. 367-158.000.

Westland Helicopters, Ltd.: *See—*
Duthie, Antony C., 4,995,931, Cl. 156-212.000.

Westling, Gregory L.: *See—*
Critchlow, David N.; Avis, Graham M.; Earlam, Sandra J. K.; Johnson, Karle J.; Smetana, Bruce A.; Westling, Gregory L.; Paneth, Eric; and Yehushua, Moshe, 4,996,697, Cl. 375-104.000.

Westmont Inc.: *See—*
Zawaski, Michael J.; and Van Possen, Don B., 4,995,620, Cl. 277-25.000.

Weston, Philip A., to PWT Projects Limited. Air and water distribution conduit. 4,995,990, Cl. 210-793.000.

Westone Products Limited: *See—*
Blass, Jacob M., 4,996,056, Cl. 424-443.000.

Westvaco Corporation: *See—*
Fremion, Edwin A., 4,995,557, Cl. 229-125.250.
Schilling, Peter, 4,995,909, Cl. 106-277.000.

Wheeler, Jerry W.; and Wiley, Walter H., III, to United Technologies Corporation. Dual variable camber compressor stator vane. 4,995,786, Cl. 415-148.000.

Whitby Research, Inc.: *See—*
Horn, Alan S., 4,996,226, Cl. 514-438.000.
Minaskanian, Gevork; and Peck, James V., 4,996,199, Cl. 514-167.000.

White, David C.: *See—*
Harvey, Robert T.; and White, David C., 4,996,628, Cl. 361-393.000.

White, Robert L.: *See—*
Seiden, Paul; and White, Robert L., 4,996,074, Cl. 426-601.000.

White, Terry L., to United States of America, Energy. Acoustic emission feedback control for control of boiling in a microwave oven. 4,996,403, Cl. 219-10.55B.

Whitehouse, Paul A.: *See—*
Kegan, Neil J.; Hitchens, Ian; Robertson, Thomas; and Whitehouse, Paul A., 4,995,592, Cl. 266-44.000.

Whitekettle, Wilson K.; and Conlan, John T., to Betz Laboratories, Inc. Enhancement of the efficacy of antimicrobials by the addition of anions capable of interfering with microbial electrochemical reactions. 4,995,987, Cl. 210-754.000.

Whitesel, J. Warren, to Mitel Corporation. Apparatus for testing spare line circuits in a communication system. 4,996,702, Cl. 379-1.000.

Whitfield, Terry B. Interactive sports training device. 4,995,607, Cl. 273-26.00R.

Whiting, Douglas L.: *See—*
George, Glen A.; and Whiting, Douglas L., 4,996,690, Cl. 371-37.100.

Whitman, Charles R.; and Dougherty, John J., Jr., to Upjohn Company, The. Ampoule sealing apparatus. 4,995,222, Cl. 53-510.000.

Whitney, Warren J., Jr.: *See—*
Pratt, George C.; and Whitney, Warren J., Jr., 4,996,025, Cl. 420-554.000.

Wideman, Lawson G.; and Sandstrom, Paul H., to Goodyear Tire & Rubber Company, The. Hydroformylated thermal oils. 4,996,258, Cl. 524-274.000.

Wideman, Lawson G.; and Sandstrom, Paul H., to Goodyear Tire & Rubber Company, The. Amide linked rosin acid derivatives. 4,996,295, Cl. 530-221.000.

Widney, Douglas F., to Data Exchange Corporation. Disk drive clock writer. 4,996,608, Cl. 360-51.000.

Wiggins, Rodney K., to United States of America, Energy. Glove box valve system. 4,995,420, Cl. 137-360.000.

Wilcox, Philip S.; Nadeau-Dostie, Benoit; and Agarwal, Vinod K., to Northern Telecom Limited. Integrated circuit testing method and apparatus and integrated circuit devices for use therewith. 4,996,691, Cl. 371-68.100.

Wilcox, Wayne F.: *See—*
Smith, Victoria L.; Wilcox, Wayne F.; and Harman, Gary E., 4,996,157, Cl. 435-254.000.

Wild, Jochen; Harreus, Albrecht; and Goetz, Norbert, to BASF Aktiengesellschaft. Preparation of aliphatically substituted fluorobenzenes. 4,996,377, Cl. 570-141.000.

Wiles, Martin C.; Schiffrin, David J.; and Clarke, David J., to Public Health Laboratory Service Board. Electrochemical electrodes. 4,995,960, Cl. 204-418.000.

Wiley, Walter H., III: *See—*
Wheeler, Jerry W.; and Wiley, Walter H., III, 4,995,786, Cl. 415-148.000.

Wilfong, Harry B., Jr., to Sonoco Products Company. Easy opening bag pack and supporting rack system and fabricating method. 4,995,860, Cl. 493-195.000.

Wilharm, Peter; Merrem, Hans-Joachim; and Pawlowski, Georg, to Hoechst Aktiengesellschaft. Polyfunctional α-diazo-β-keto esters and their use in light-sensitive compositions. 4,996,301, Cl. 534-556.000.

Wilke, Thomas A.: *See—*
Schubert, W. Peter; and Wilke, Thomas A., 4,995,547, Cl. 228-124.000.

Wilkins, Suzanne R.: *See—*
Yaeger, John R.; and Wilkins, Suzanne R., 4,996,617, Cl. 360-105.000.

Williams Instruments, Inc.: *See—*
Williams, Robert A.; and Tye, Stephen, 4,996,520, Cl. 340-662.000.

Williams, Robert A.; and Tye, Stephen, to Williams Instruments, Inc. Overvoltage detection test apparatus for military aircraft weapons systems. 4,996,520, Cl. 340-662.000.

Williams, Robert M. Method of disposing of waste material. 4,995,324, Cl. 110-234.000.

Wilmer, Richard K.: *See—*
Erpelding, A. David; Palmer, Darrell D.; and Wilmer, Richard K., 4,996,623, Cl. 360-104.000.

Wilmotte, Stephan: *See—*
Naveau, Paul; and Wilmotte, Stephan, 4,995,446, Cl. 164-437.000.

Wilson, Mark L., to Unisys Corporation. Multi-position opto-electronic switch. 4,995,693, Cl. 350-96.180.

Winalis, Kenneth L.: *See—*
Horansky, John; and Winalis, Kenneth L., 4,995,660, Cl. 293-132.000.

Winchester, Bryan: *See—*
Fleet, George W. J.; Winchester, Bryan; and Carpenter, Neil M., 4,996,329, Cl. 548-453.000.

Winter, Johann. Pneumatic extraction head. 4,995,175, Cl. 37-63.000.

Wisconsin Alumni Research Foundation: *See—*
Guckel, Henry; and Burns, David W., 4,996,082, Cl. 427-99.000.

Withrow, Shelby M.: *See—*
Denney, Michael L.; Withrow, Shelby M.; and Delancey, John M., Sr., 4,995,896, Cl. 65-260.000.

Woerner, Frank P.: *See—*
Berbner, Heinz; Ebel, Klaus; Kuczaty, Michael; Seid, Bernhard; Woerner, Frank P.; and Zettler, Hans D., 4,996,289, Cl. 528-230.000.

Wojcik, Thaddeus: *See—*
Arvikar, Ram J.; Benko, John W.; Coucoulas, Alexander; and Wojcik, Thaddeus, 4,995,149, Cl. 29-25.350.

Wolbers, Eugene A.: *See—*
Babcock, Bryce W.; Kiblawi, Daniel F.; and Wolbers, Eugene A., 4,995,492, Cl. 192-85.0CA.

Wolf, Helmut: *See—*
Riedel, Wolfgang; Knothe, Manfred; Grisar, Roland; Wolf, Helmut; and Preier, Horst M., 4,995,725, Cl. 356-334.000.

Wolf, Hugh M. Luminous display frame and kit. 4,995,181, Cl. 40-152.200.

Wolf, Johann, to Wolf Systembau Gesellschaft m.b.H. KG. Connecting element. 4,995,214, Cl. 52-657.000.

Wolf Systembau Gesellschaft m.b.H. KG.: *See—*
Wolf, Johann, 4,995,214, Cl. 52-657.000.

Wong, David T.: *See—*
Robertson, David W.; and Wong, David T., 4,996,235, Cl. 514-649.000.

Wood, Barry L. Fishing plug organizer. 4,995,577, Cl. 248-205.300.

Wood, John E.: *See—*
Jacobsen, Stephen C.; and Wood, John E., 4,995,261, Cl. 73-767.000.

Wood, Peter: *See—*
Denny, Patrick J.; and Wood, Peter, 4,996,181, Cl. 502-414.000.

Woodard, Winfred L., III: *See—*
Sandrock, Gary D.; and Woodard, Winfred L., III, 4,996,002, Cl. 252-181.600.

Wooden, James R.: *See—*
McSparran, Ray A.; Moore, William S.; and Wooden, James R., 4,996,487, Cl. 324-549.000.

Woodruff, Keith F., to American Cyanamid Company. Air treatment device and method. 4,995,555, Cl. 239-43.000.

Woods, Quentin T., to Boeing Company, The. Assembly jig and method for making wing spars. 4,995,146, Cl. 29-281.300.

Woodville Polymer Engineering Limited: *See—*
Broadhurst, Jeffrey C., 4,996,536, Cl. 343-912.000.

Woodward, Charlene A.: *See—*
Scott, Charles D.; Woodward, Charlene A.; and Byers, Charles H., 4,995,985, Cl. 210-679.000.

Worldwide Medical Plastics Inc.: *See—*
Gahara, William J.; and Johnson, Thomas R., 4,995,865, Cl. 604-43.000.

Wormsbacher, Hans: *See—*
Schwarzler, Peter; Wormsbacher, Hans; and Beier, Rudolf, 4,995,853, Cl. 464-144.000.

Wridge, Wilbur S., Jr.; and Everard, Lloyd D., to Sustena, Inc. Constant pressure load bearing air chamber. 4,995,124, Cl. 5-450.000.

Wright, Danny W.; and Wagner, Barry L., to Atochem North America, Inc. Process for production of 1,1-dichloro-1-fluoroethane and/or 1-chloro-1,1-difluoroethane. 4,996,378, Cl. 570-164.000.

Wright, Jeremy C.: *See—*
Eckenhoff, James B.; Magruder, Judy A.; Cortese, Richard; Peery, John R.; and Wright, Jeremy C., 4,996,060, Cl. 424-473.000.

Wright, John H. Animal restraint cage. 4,995,335, Cl. 119-98.000.

Wright, Steven A.: *See—*
Sharp, Donald J.; Vernon, Milton E.; and Wright, Steven A., 4,995,947, Cl. 204-1.500.

Wu, Ching K.: *See—*
Hong, Ming-Che; Wu, Ching K.; and Lee, Martin, 4,995,174, Cl. 36-72.00R.

Wu, Margaret M.: *See—*
Pelrine, Bruce P.; and Wu, Margaret M., 4,996,384, Cl. 585-530.000.

Wuerzer, Bruno: *See—*
Scholz, Herbert; Zeidler, Adolf; Wuerzer, Bruno; and Meyer, Norbert, 4,995,899, Cl. 71-92.000.

Wulf, R. Gary: *See—*
Phan, Hieu D.; Carrier, Gary W.; Stockl, Rebecca R.; Tortorici, Frank J.; and Wulf, R. Gary, 4,996,252, Cl. 524-88.000.

Wurster, Markus: *See*—
Guenkinger, Siegfried; Wurster, Markus; Langen, Manfred; and Gebald, Gregor, 4,995,140, Cl. 19-159.00A.
Wutschke, Hans J.: *See*—
Filges, Ralf; Klotmann, Fred; and Wutschke, Hans J., 4,995,809, Cl. 432-118.000.
Wycech, Joseph, to Essex Composite Systems. Method of reinforcing a structure member. 4,995,545, Cl. 228-119.000.
Wycliffe, Henryk, to BOC Group, plc, The. Vacuum pumps. 4,995,794, Cl. 417-431.000.
Xerox Corporation: *See*—
Gray, Gerald A., Jr., 4,996,556, Cl. 355-50.000.
Hack, Michael; Shaw, John G.; and Shur, Michael, 4,996,573, Cl. 357-23.700.
Hauser, Oscar G.; Anderson, Robert W.; and Hart, Lawrence M., 4,996,425, Cl. 250-325.000.
Herley, James A., 4,996,565, Cl. 355-245.000.
Xigas, Constantine, to Xigas Holdings Pty. Ltd. Apparatus for protecting an external mechanism. 4,995,496, Cl. 194-350.000.
Xigas Holdings Pty. Ltd.: *See*—
Xigas, Constantine, 4,995,496, Cl. 194-350.000.
Xtramedics, Inc.: *See*—
Gerstenberger, Roland W.; and Cantrell, Philip E., 4,995,150, Cl. 28-119.000.
Yaeger, John R.; and Wilkins, Suzanne R., to Seagate Technology, Inc. Disc drive safety latch using shape memory metals. 4,996,617, Cl. 360-105.000.
Yaeger, William L.: *See*—
Lebovits, Alexander; Yaeger, William L.; Mercer, William B.; and Dapp, Timothy L., 4,996,261, Cl. 525-131.000.
Yagii, Kiyoshi: *See*—
Oshio, Hideki; Mishumi, Sadaharu; Yagii, Kiyoshi; Yoshikawa, Satoshi; and Murata, Katsuyoshi, 4,996,379, Cl. 570-176.000.
Yagoto, Mitsutoshi: *See*—
Mori, Shinichi; Hamada, Akiyoshi; Yagoto, Mitsutoshi; and Murakami, Masanori, 4,996,541, Cl. 346-108.000.
Yaguchi, Yoichi: *See*—
Mae, Yutaka; Yaguchi, Yoichi; and Sakamoto, Masakatsu, 4,996,119, Cl. 428-469.000.
Yale Security Inc.: *See*—
Schultze, Eckart F.; Easter, Richard; and Funderburk, Robert V., 4,995,194, Cl. 49-32.000.
Yamada, Shiro; Hirata, Keiichi; Oishi, Minoru; Morimoto, Yoshinari; Furukawa, Akihiro; and Kawasumi, Atsuko, to Brother Kogyo Kabushiki Kaisha. Data processing system. 4,996,640, Cl. 364-200.000.
Yamada, Takehiko: *See*—
Nagata, Tatsuya; Watanabe, Michihiro; Hara, Eiichi; and Yamada, Takehiko, 4,996,438, Cl. 250-211.00R.
Yamada, Takuzi: *See*—
Miyoshi, Takahito; Kanazawa, Minoru; Sugisaki, Tsutomu; Yamada, Takuzi; and Okuzawa, Yasutoshi, 4,995,199, Cl. 51-326.000.
Yamada, Yoshihiro: *See*—
Hayakawa, Youichi; Kuwayama, Yoshinari; and Yamada, Yoshihiro, 4,995,285, Cl. 74-869.000.
Yamagishi, Jun; Nishikawa, Hiromitsu; and Takeda, Akihiro, to Ohi Seisakusho Co., Ltd. Wire terminal attaching structure of a driven rotary body. 4,995,568, Cl. 242-125.100.
Yamaguchi, Kiyoshi: *See*—
Kitamura, Masashi; Kobayashi, Takashi; Kakiuchi, Shunji; Yamaguchi, Kiyoshi; Tomeoku, Hiroshi; Maki, Naoki; Nakata, Jyoji; and Uno, Yasumichi, 4,996,496, Cl. 328-228.000.
Yamaguchi, Kohichi, to Konica Corporation. Film feeding control device for camera. 4,996,549, Cl. 354-173.110.
Yamaguchi, Kouji; and Maki, Kazuya, to Honda Giken Kogyo Kabushiki Kaisha. Control apparatus for hydraulic continuously variable speed transmission. 4,995,470, Cl. 180-197.000.
Yamaguchi, Mitsuyoshi: *See*—
Arisaka, Tomokichi; and Yamaguchi, Mitsuyoshi, 4,995,298, Cl. 82-127.000.
Yamaguchi, Noboru; Nakamura, Hideo; Hagiwara, Yoshimune; Sato, Tsukasa; and Koizumi, Haruo, to Hitachi, Ltd. Method of diagnosing integrated logic circuit. 4,996,659, Cl. 364-579.000.
Yamaguchi, Nobuo: *See*—
Hara, Naoki; and Yamaguchi, Nobuo, 4,995,471, Cl. 180-219.000.
Yamaguchi, Toshiharu: *See*—
Inujima, Takashi; Yamazaki, Shunpei; Konuma, Toshimitsu; Hamatani, Toshiji; Sakama, Mitsunori; Yamaguchi, Toshiharu; and Kobayashi, Ippei, 4,995,706, Cl. 350-350.00S.
Yamakawa, Takeshi: *See*—
Yoshimura, Tsuyoshi; and Yamakawa, Takeshi, 4,996,561, Cl. 355-202.000.
Yamamoto, Tomiaki; Murayama, Akio; Kondo, Susmu; Hato, Hitoshi; Kamagami, Shinichi; and Matsumoto, Shoichi, to Kabushiki Kaisha Toshiba. Liquid crystal display device. 4,995,704, Cl. 350-334.000.
Yamamoto, Yoshimi: *See*—
Tobita, Tomoyuki; and Yamamoto, Yoshimi, 4,995,266, Cl. 73-706.000.
Yamanaka, Hiroshi: *See*—
Yokoi, Takeshi; Nakamura, Shigeo; and Yamanaka, Hiroshi, 4,995,745, Cl. 400-605.000.
Yamanaka, Motosuke: *See*—
Oinuma, Hitoshi; Yamanaka, Motosuke; Miyake, Kazutoshi; Hoshiko, Tomonori; Minami, Norio; Shoji, Tadao; Daiku, Yoshiharu; Sawada, Kohei; and Nomoto, Kenichi, 4,996,215, Cl. 514-316.000.
Yamanaka, Satoshi: *See*—
Wada, Noriyuki; and Yamanaka, Satoshi, 4,995,623, Cl. 277-208.000.
Yamane, Yoshitaka: *See*—
Wakabayashi, Shigeru; Saijo, Yoshihiro; Yamane, Yoshitaka; and Fujikawa, Yasuji, 4,995,431, Cl. 141-116.000.
Yamanouchi Pharmaceutical Co., Ltd.: *See*—
Tsukamoto, Shin-ichi; Nagaoka, Hitoshi; Usuda, Shinji; Harada, Masatomi; and Tamura, Toshinari, 4,996,210, Cl. 514-278.000.
Yamashiro, Kunio: *See*—
Tokuhiro, Tomoya; Koibuchi, Nobutaka; Miyauchi, Teruhiko; Kikuchi, Koshin; Hirokawa, Jun; Yamashiro, Kunio; Nishizuka, Sakae; Watanabe, Ippei; Maruo, Shozo; Tsutsui, Yohichiro; and Ishikawa, Sadahito, 4,995,765, Cl. 406-117.000.
Yamashita, Sadao: *See*—
Ishikawa, Youhei; Hiratsuka, Toshiro; Abe, Hirotsugu; Takagaki, Hisashi; and Yamashita, Sadao, 4,996,506, Cl. 333-219.100.
Yamashita, Toshihiro: *See*—
Yoshinaka, Yasuo; Kuze, Katsuaki; Isaka, Tsutomu; Yamashita, Toshihiro; Matsuyama, Yujiro; Nakamura, Koichiro; Matsunaga, Tsuyoshi; and Makimura, Osamu, 4,996,291, Cl. 528-272.000.
Yamashita, Tsuyoshi; Kobayashi, Goro; Nakamura, Hisanori; Shibata, Youichi; and Mori, Toshihiro, to Toyoda Koki Kabushiki Kaisha; Toyota Jidosha Kabushiki Kaisha; and Hokuyo Automatic Company, Ltd. Optical transmission device. 4,996,683, Cl. 370-4.000.
Yamashita, Yoshimi; and Horiuchi, Kei, to Fujitsu Limited. Irradiation equipment for applying synchrotron radiation. 4,996,700, Cl. 378-145.000.
Yamauchi, Hirohiko: *See*—
Sakata, Isao; Nakajima, Susumu; Koshimizu, Koichi; Samejima, Natsuki; Inohara, Kazumi; Takata, Hiroyuki; Yamauchi, Hirohiko; Ueda, Nobuo; and Hazue, Masaaki, 4,996,312, Cl. 540-145.000.
Yamauchi, Teruo; and Sasayama, Akao, to Hitachi America, Ltd. System and method of control of internal combustion engine using methane fuel mixture. 4,995,367, Cl. 123-494.000.
Yamazaki, Junichi: *See*—
Koiwai, Hideo; Yamazaki, Junichi; Yoshino, Kunio; and Tsuruoka, Masaharu, 4,995,581, Cl. 248-480.000.
Yamazaki, Shunpei: *See*—
Inujima, Takashi; Yamazaki, Shunpei; Konuma, Toshimitsu; Hamatani, Toshiji; Sakama, Mitsunori; Yamaguchi, Toshiharu; and Kobayashi, Ippei, 4,995,706, Cl. 350-350.00S.
Yamazaki, Taro: *See*—
Ohkawa, Kazuhiro; and Yamazaki, Taro, 4,996,511, Cl. 338-114.000.
Yanagawa, Yutaka: *See*—
Inaba, Makoto; Hayashi, Masaaki; Hashiguchi, Toshihiko; Hibino, Hiroki; Sasa, Hiroyuki; Barlow, David E.; Ohshima, Yutaka; Ishihara, Kohichiro; Yanagawa, Yutaka; Tagawa, Motoyuki; Takayama, Shuichi; Tsukaya, Takashi; Klosterman, Frank; and Goodman, Jack, 4,995,396, Cl. 128-654.000.
Yanagi, Kyotaro: *See*—
Hasebe, Kanteru; Matsuoka, Hiroshi; and Yanagi, Kyotaro, 4,995,855, Cl. 474-167.000.
Yanagihara, Hitoshi; and Tokushuku, Nobuhiro, to Hitachi, Ltd. Optical information medium having paired wobble pitts with continuous groove therebetween. 4,996,682, Cl. 369-275.400.
Yanagisawa, Ken. Two dimensional drive system. 4,995,277, Cl. 74-89.150.
Yang, Y. Sam: *See*—
Scott, Bentley N.; and Yang, Y. Sam, 4,996,490, Cl. 324-639.000.
Yano, Hideo: *See*—
Takagi, Shigehide; Yano, Hideo; Oku, Takashi; Shigeru, Keijiro; Kuboto, Yoshifumi; and Shishikura, Tsutomu, 4,996,177, Cl. 501-153.000.
Yao, Raymond C.: *See*—
Doolin, Lawrence E.; Gale, Richard M.; Godfrey, Otis W.; Hamill, Robert L.; Mahoney, David F.; and Yao, Raymond C., 4,996,148, Cl. 435-119.000.
Yasuda, Megumi: *See*—
Watarai, Shinichi; Yasuda, Megumi; Hoki, Yoji; and Inoue, Makoto, 4,996,567, Cl. 355-290.000.
Yazaki Corporation: *See*—
Saimoto, Tetsuro, 4,995,818, Cl. 439-74.000.
Yazu, Shuji: *See*—
Fujimori, Naoji; Harada, Keizo; Yazu, Shuji; and Jodai, Tetsuji, 4,996,185, Cl. 505-1.000.
Higaki, Kenjiro; Harada, Keizo; Fujimori, Naoji; Itozaki, Hideo; and Yazu, Shuji, 4,996,190, Cl. 505-1.000.
Yeager, Michael W.: *See*—
Cox, Roger G.; Yeager, Michael W.; and Flake, Lance L., 4,996,661, Cl. 364-748.000.
Yeda Research and Development Co. Ltd.: *See*—
Cohen, Irun R.; and Shinitzky, Meir, 4,996,194, Cl. 514-21.000.
Pecht, Israel; and Hemmerich, Stefan, 4,996,296, Cl. 530-350.000.
Yee, Loren; and Sinh, Nguyen X., to National Semiconductor Corporation. ECL/TTL tristate buffer. 4,996,452, Cl. 307-475.000.
Yee, Renwin J., to Motorola, Inc. Method of forming a semiconductor membrane using an electrochemical etch-stop. 4,995,953, Cl. 204-129.300.

Yehushua, Moshe: *See*—
Critchlow, David N.; Avis, Graham M.; Earlam, Sandra J. K.; Johnson, Karle J.; Smetana, Bruce A.; Westling, Gregory L.; Paneth, Eric; and Yehushua, Moshe, 4,996,697, Cl. 375-104.000.

Yokoi, Takeshi; Nakamura, Shigeo; and Yamanaka, Hiroshi, to Brother Kogyo Kabushiki Kaisha. Printer with multi-function paper feeding mechanism. 4,995,745, Cl. 400-605.000.

Yokonuma, Norikazu: *See*—
Matsui, Hideki; Hagiuda, Nobuyoshi; Yokonuma, Norikazu; Sakamoto, Hiroshi; and Iida, Yoshikazu, 4,996,550, Cl. 354-420.000.

Yokota, Yoshio: *See*—
Matsuda, Hideo; Fujiwara, Takashi; Yokota, Yoshio; Kitagawa, Mitsuhiko; Iwasaki, Masami; and Watanuki, Kazuo, 4,996,586, Cl. 357-74.000.

Yokoyama, Junichi; Urushihara, Tomonori; Itoh, Teruyuki; and Fujii, Hiroyuki, to Nissan Motor Co., Ltd. Combustion chamber for internal combustion engine. 4,995,359, Cl. 123-188.00M.

Yokoyama, Tetsuo: *See*—
Maeda, Akira; Sano, Koichi; Yokoyama, Tetsuo; and Koizumi, Hideaki, 4,996,480, Cl. 324-309.000.

Yoneda, Kenzi: *See*—
Fujiwara, Michio; Matsumaru, Hiroshi; Kobayashi, Yasushi; Sakai, Yoshio; Yoneda, Kenzi; Dohi, Osamu; and Noguchi, Akihiko, 4,995,479, Cl. 187-135.000.

Yoshida, Akira: *See*—
Inomata, Hiroshi; Kishita, Hirofumi; and Yoshida, Akira, 4,996,344, Cl. 556-448.000.

Yoshida, Kazunobu: *See*—
Kobayashi, Sadao; Tomono, Hidemi; and Yoshida, Kazunobu, 4,995,286, Cl. 82-101.000.

Yoshida, Kinoto; Fujii, Morizumi; Tsuda, Tokihiro; Suda, Shigeo; Kodama, Osamu; Kuroe, Kazuro; Tanikawa, Takumi; Nishimura, Michihiko; and Munakata, Hideyuki, to Chichibu Cement Co., Ltd.; Inax Corporation; and ILB Co., Ltd. Method for production of paving blocks. 4,995,932, Cl. 156-242.000.

Yoshida Kogyo K. K.: *See*—
Akashi, Shunji, 4,995,656, Cl. 292-307.00R.

Yoshida, Tetsuo, to Oki Electric Industry Co., Ltd. Video communication apparatus capable of electronically adjusting the field of view of a video frame. 4,996,592, Cl. 358-85.000.

Yoshida, Yasushi: *See*—
Matsuura, Ikuya; and Yoshida, Yasushi, 4,996,382, Cl. 585-500.000.

Yoshie, Tatsuya: *See*—
Imai, Shin-ichi; and Yoshie, Tatsuya, 4,996,686, Cl. 377-60.000.

Yoshikawa, Satoshi: *See*—
Oshio, Hideki; Mishumi, Sadaharu; Yagii, Kiyoshi; Yoshikawa, Satoshi; and Murata, Katsuyoshi, 4,996,379, Cl. 570-176.000.

Yoshikawa, Shigeo: *See*—
Nishida, Yasuaki; Iino, Yoshiki; Ohtake, Hiroshi; Abe, Masahide; Yoshikawa, Shigeo; Endo, Yukio; Matsunaga, Yoshiyuki; and Harada, Nozomu, 4,996,600, Cl. 358-213.220.

Yoshimoto, Masafumi; Nakatsuji, Tadao; and Sato, Noriaki, to Sakai Chemical Industry Co., Ltd. Methods of producing ceramic honeycomb structures. 4,996,015, Cl. 264-177.110.

Yoshimoto, Sadao: *See*—
Saeki, Kenji; Fukuhara, Hiroshi; Agoo, Tokinori; Taguchi, Toru; Miki, Hisaya; Haneda, Yutaka; and Yoshimoto, Sadao, 4,996,372, Cl. 568-717.000.

Yoshimoto, Tokuji: *See*—
Inagaki, Takashi; Yoshimoto, Tokuji; Okubo, Michio; Okazaki, Kouji; and Ikeda, Tsugio, 4,995,448, Cl. 165-44.000.

Yoshimura, Hideshi: *See*—
Nasu, Rikuo; Komyoji, Terumasa; Nakajima, Toshio; Suzuki, Kazumi; Ito, Keiichiro; Oshima, Takeshi; and Yoshimura, Hideshi, 4,995,898, Cl. 71-90.000.

Yoshimura, Tsuyoshi; and Yamakawa, Takeshi, to Ricoh Company, Ltd. Image forming apparatus with a document image edition function. 4,996,561, Cl. 355-202.000.

Yoshinaga, Kazuo; Miyazaki, Takeshi; Ohnishi, Toshikazu; Kurabayashi, Yutaka; Takasu, Yoshio; and Kobayashi, Tadashi, to Canon Kabushiki Kaisha. Device, method and apparatus for optical modulation using ferroelectric polymer liquid crystals. 4,995,705, Cl. 350-350.00S.

Yoshinaga, Sadao; and Mashine, Hiroyoshi, to Prince Industrial Development Co., Ltd. Gas combustion type dryer. 4,995,171, Cl. 34-97.000.

Yoshinaka, Yasuo; Kuze, Katsuaki; Isaka, Tsutomu; Yamashita, Toshihiro; Matsuyama, Yujiro; Nakamura, Koichiro; Matsunaga, Tsuyoshi; and Makimura, Osamu, to Toyo Boseki Kabushiki Kaisha. Thermo-shrinkable polyester film. 4,996,291, Cl. 528-272.000.

Yoshino, Kunio: *See*—
Koiwai, Hideo; Yamazaki, Junichi; Yoshino, Kunio; and Tsuruoka, Masaharu, 4,995,581, Cl. 248-480.000.

Yoshino, Yoshiro: *See*—
Sano, Yoshiaki; Hanazawa, Toshio; and Yoshino, Yoshiro, 4,996,501, Cl. 330-279.000.

Yoshio, Junichi, to Pioneer Electronic Corporation. Subcode information and block identification system for a disc player. 4,996,679, Cl. 369-33.000.

Yoshioka, Takeo; Chida, Noritaka; Watanabe, Azuma; Fukagawa, Yasuo; and Ishikura, Tomoyuki, to Sanraku Incorporated. 6-(disubstituted amino)carbapenem compounds. 4,996,314, Cl. 540-364.000.

Young, Peter L.; Cech, Jay; and Li, Kin, to Gould, Inc. Thin-film electrical connections for integrated circuits. 4,996,584, Cl. 357-71.000.

Young, Vernon L.: *See*—
Destouet, Judy M.; Eichling, John O.; Gilula, Louis A.; Monsees, Barbara S.; and Young, Vernon L., 4,995,882, Cl. 623-8.000.

Yount, Larry J.: *See*—
Hess, Richard F.; Liebel, Kurt A.; and Yount, Larry J., 4,996,687, Cl. 371-10.100.

Yourgalite, Ray A.; Moore, Malcolm; Chamberlain, Neal C.; Becicka, Kenneth F.; Hilgeman, Samuel J.; and Moore, Kevin D., to FMC Corporation. Stretch wrapping palletizer. 4,995,224, Cl. 53-540.000.

Youtsey, Thomas E.: *See*—
Leist, Alan R.; Mushaben, Thomas G.; and Youtsey, Thomas E., 4,995,441, Cl. 160-229.100.

Yovchev, Rumen B.: *See*—
Lingorski, Nikola A.; Hadjiiski, Mincho B.; Yovchev, Rumen B.; Spassov, Kamen B.; and Savov, Peter H., 4,995,732, Cl. 374-139.000.

Yukimi, Oogawara, to Nakaya Jitsugyo Co., Ltd. Ground sand maker. 4,995,561, Cl. 241-62.000.

Yun, Jae S. Bicycle utilizing the vector system. 4,995,627, Cl. 280-261.000.

Yunoki, Yutaka, to Olympus Optical Co., Ltd. Disk-type magnetic recording apparatus with video signal discrimination means. 4,996,610, Cl. 360-61.000.

Yushiro Chemical Industry Co., Ltd.: *See*—
Noda, Masahiro; Fuchigami, Masaharu; and Akagawa, Akira, 4,995,997, Cl. 252-49.500.

Zaehner, Hans; Bernhard, Konrad; and Weisser, Harald. Preparation of spore-free, concentrated protein preparations from *bacillus thuringiensis* serovar, *israelensis*, which is toxic for gnats, a microorganism for their preparation, and the isolation of the microorganism. 4,996,156, Cl. 435-252.500.

Zajacek, John G.: *See*—
Kesling, Haven S., Jr.; Shawl, Edward T.; and Zajacek, John G., 4,996,359, Cl. 564-50.000.

Zalenski, Thomas C.; and Barbetti, Jamie L., to Summagraphics Corporation. Digitizer tablet with split-current conductor array. 4,996,393, Cl. 178-19.000.

Zander, Richard A.: *See*—
Crumb, Donald A.; Zander, Richard A.; and Gaiser, Robert F., 4,995,676, Cl. 303-9.630.

Zanders, Gary V.; and Lee, Robert D., to Dallas Semiconductor. Power down circuit for low-power circuit with dual supply voltages. 4,996,453, Cl. 307-475.000.

Zarabadi, Seyed R.; and Pham, Linh N., to Delco Electronics Corporation. Amplitude stabilized oscillator amplifier. 4,996,499, Cl. 330-264.000.

Zarger, Tony H.: *See*—
Stegeman, George T.; Zarger, Tony H.; and Outland, Robert J., 4,995,353, Cl. 123-90.480.

Zaunberger, Franz X., to Renk Aktiengesellschaft. Tracked vehicle drive system. 4,995,276, Cl. 74-89.150.

Zawaski, Michael J.; and Van Possen, Don B., to Westmont Inc. Self-compensating seal for a rotating shaft. 4,995,620, Cl. 277-25.000.

Zeidler, Adolf: *See*—
Scholz, Herbert; Zeidler, Adolf; Wuerzer, Bruno; and Meyer, Norbert, 4,995,899, Cl. 71-92.000.

Zembrowski, William J.: *See*—
Mylari, Banavara L.; and Zembrowski, William J., 4,996,204, Cl. 514-248.000.

Zemerov, Valery N.: *See*—
Mikheev, Sergei M.; Zemerov, Valery N.; and Elshansky, Petr V., 4,995,267, Cl. 73-800.000.

Zettler, Hans D.: *See*—
Berbner, Heinz; Ebel, Klaus; Kuczaty, Michael; Seid, Bernhard; Woerner, Frank P.; and Zettler, Hans D., 4,996,289, Cl. 528-230.000.

Zias, Arthur R.; Block, Barry; Mapes, Kenneth W.; Nystrom, Norman L.; and Cadwell, Robert M., to Dresser Industries, Inc. High sensitivity miniature pressure transducer. 4,996,627, Cl. 361-283.000.

Ziebold, Steven A.: *See*—
McAlister, Donald R.; and Ziebold, Steven A., 4,996,038, Cl. 423-522.000.

Ziegler, Andreas; and Geiger, Karl-Heinz. Device and method for the electrophoretic separation of macromolecules. 4,995,957, Cl. 204-182.800.

Zielinski, James S.: *See*—
Geib, Lawrence E.; Bailey, William R.; and Zielinski, James S., 4,995,829, Cl. 439-409.000.

Zieren, Victor: *See*—
Ruigrok, Jacobus J. M.; Zieren, Victor; Enz, Ulrich E.; and Druyvesteyn, Willem F., 4,996,621, Cl. 360-126.000.

Zimmer, Hans W.; Martelo, Orlando J.; and Franco, Robert S., to University of Cincinnati. 3-(heteroarylalkyene)- and 3-(arylalkylene)-2,4(3H,5H)-heterocyclic diones as cancer chemotherapy drugs. 4,996,227, Cl. 514-444.000.

Zinser Textilmaschinen GmbH: *See*—
Guenkinger, Siegfried; Wurster, Markus; Langen, Manfred; and Gebald, Gregor, 4,995,140, Cl. 19-159.00A.

Zivari, Bashir. Modular stool. 4,995,668, Cl. 297-248.000.

Zollinger, Eugene A. Aural medication dispenser. 4,995,867, Cl. 604-54.000.

Zonagen, Inc.: *See*—
Dunbar, Bonita S., 4,996,297, Cl. 530-395.000.

Zuccaro, Dante C.: *See*—
Cotsman, David N.; Kovach, John; Zuccaro, Dante C.; and Kudwa, Frank J., 4,995,493, Cl. 192-150.000.

Zuckert, Bertram: *See*—
Awad, Rami-Raimund; Dworak, Gert; Zuckert, Bertram; and Weger, Walter, 4,996,250, Cl. 523-500.000.
Zuliani, Sandro, to Bobst SA. Rewinder for thin tape. 4,995,564, Cl. 242-67.10R.
Zupanick, Joseph E., to Atlantic Richfield Company. Method for making a reflectance calibration plate having a near-Lambertian surface. 4,995,198, Cl. 51-319.000.
3D Systems, Inc.: *See*—
Modrek, Borzo, 4,996,010, Cl. 264-22.000.
501 Philips & Du Pont Optical Company: *See*—
Langowski, Horst-Christian, 4,996,078, Cl. 427-38.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 26TH DAY OF FEBRUARY, 1991

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Dennis, David, to Look Alpine Products, Inc.. Releasable binding system for snowboarding. Re. 33,544, Cl. 280-618.000.

Gaughan, Roger G., to Phillips Petroleum Company. Preparation of a high molecular weight poly(arylene sulfide ketone). Re. 33,545, Cl. 528-226.000.

General Kinematics Corporation: *See*—
Musschoot, Albert, Re. 33,542, Cl. 51-7.000.

Look Alpine Products, Inc.: *See*—
Dennis, David, Re. 33,544, Cl. 280-618.000.

Musschoot, Albert, to General Kinematics Corporation. Tumbling apparatus. Re. 33,542, Cl. 51-7.000.

Phillips Petroleum Company: *See*—
Gaughan, Roger G., Re. 33,545, Cl. 528-226.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Bergen Barrel & Drum Co.: *See*—
Zilbert, Seymour, B1 4,094,432, Cl. 220-404.000.

Hamada, Mitsuo: *See*—
Shimizu, Koji; and Hamada, Mitsuo, B1 4,742,142, Cl. 528-15.000.

LaMonica, Joseph B., to Runnels, Ann. Spear point for fishing spear guns. B1 4,685,239, 2-26-91, Cl. 43-6.000.

Runnels, Ann: *See*—
LaMonica, Joseph B., B1 4,685,239, Cl. 43-6.000.

Shimizu, Koji; and Hamada, Mitsuo, to Toray Silicone Company, Ltd. Method for producing silicone rubber powder. B1 4,742,142, 2-26-91, Cl. 528-15.000.

Toray Silicone Company, Ltd.: *See*—
Shimizu, Koji; and Hamada, Mitsuo, B1 4,742,142, Cl. 528-15.000.

Zilbert, Seymour, to Bergen Barrel & Drum Co. Industrial drums. B1 4,094,432, 2-26-91, Cl. 220-404.000.

LIST OF DESIGN PATENTEES

A/S Ruko: *See*—
Pedersen, Jakob B., 314,908, Cl. D8-334.000.

Aavid Engineering, Inc.: *See*—
McCarthy, Alfred F., 314,945, Cl. D13-179.000.

Abbestam, Goran; and Lachonius, Leif, to SKF Specialty Products AB. Beam. 315,027, 2-26-91, Cl. D25-124.000.

Abbott, Timothy R. Caliper. 314,924, 2-26-91, Cl. D10-73.000.

Abrams, Lorne. Modular wheel chair ramp unit. 315,046, 2-26-91, Cl. D34-32.000.

Ackeret, Peter A., to IDN Inventions and Development of Novelties AG. Container for disks. 314,861, 2-26-91, Cl. D3-35.000.

Adam, Kathleen D. Vehicle sun visor. 314,937, 2-26-91, Cl. D12-191.000.

Aerodyne Controls Corporation: *See*—
Tetrault, Leonard P.; and Miller, James R., 314,939, Cl. D13-158.000.

AGHIFUG S.p.A.: *See*—
Bonomi, Bortolo, 314,889, Cl. D7-687.000.

Akiyama, Koichi: *See*—
Sato, Kensaku; and Akiyama, Koichi, 314,942, Cl. D13-147.000.

Alco Industries Inc.: *See*—
Goetz, Charles R., 314,871, Cl. D6-368.000.

Amachi, Ryusuke; and Tanaka, Masanori, to Hosiden Electronics Co., Ltd. RF coaxial connector. 314,941, 2-26-91, Cl. D13-133.000.

Anderson, Bruce O.: *See*—
Bush, Paul; and Anderson, Bruce O., 314,877, Cl. D6-479.000.

Anderson, Kenneth W., to Anderson Seal Company. Garage floor car stop. 314,938, 2-26-91, Cl. D12-217.000.

Anderson Seal Company: *See*—
Anderson, Kenneth W., 314,938, Cl. D12-217.000.

Armstrong, Yvonne K.: *See*—
Tackett, Edd; and Armstrong, Yvonne K., 314,901, Cl. D8-89.000.

Artifax Design International Corporation: *See*—
Camacho, Jeffrey F., 314,868, Cl. D6-334.000.

Asano, Kiyoshi: *See*—
Takayama, Hajime; Tomachi, Hidenori; Okano, Hiroshi; Asano, Kiyoshi; Koda, Hironosuke; and Fujimoto, Munenori, 314,931, Cl. D14-118.000.

Asano, Shinichi: *See*—
Kameda, Yasuhisa; and Asano, Shinichi, 315,011, Cl. D22-140.000.

Aspri, Roberto; Maufette, Claude; and Dallaire, Michel, to Les Entreprises Roberto Aspri Ltee. Sound reverberator for string musical instrument. 314,968, 2-26-91, Cl. D17-20.000.

Associated Mills, Inc.: *See*—
Geneve, Francois; Heiligenstein, Luc; and Melamed, Stephen, 315,015, Cl. D23-229.000.

Atrium Structures, Inc.: *See*—
Jenn, Louis J., 315,023, Cl. D25-17.000.

August Froscher GmbH & Co. K.G.: *See*—
Engel, Hartmut S., 314,872, Cl. D6-380.000.

Austin, Lloyd W. Sewing accessory holder. 314,860, 2-26-91, Cl. D3-25.000.

Avia Group International, Inc.: *See*—
Richard, Daniel; Spinney, K. Wayne; and Mourad, Miza, 314,858, Cl. D2-314.000.

Battaglia Shops, Inc.: *See*—
Ricci, Stefano, 314,907, Cl. D9-432.000.

Beachy, Robert W.: *See*—
Jacobs, Richard H.; Keagle, Ronald T.; Peterson, Gerald E.; and Beachy, Robert W., 315,030, Cl. D26-63.000.

Bennett, Earle C. Snowman accessory kit. 315,001, 2-26-91, Cl. D21-189.000.

Berger, Hugo: *See*—
Grinberg, Gedalio; and Berger, Hugo, 314,927, Cl. D10-126.000.

Berggren, Ib H., to Interlego AG. Toy truck. 314,998, 2-26-91, Cl. D21-134.000.

Berry, Richard D., Jr., to Design Institute America, Inc. Torchiere. 315,031, 2-26-91, Cl. D26-105.000.

Best, Melvin H. M.; Denninger, Valentine L.; Tang, John G.; Weber, Lynn; Janowski, Paul K.; and Stavros, Andrew, to Trimble Navigation, Ltd. Cabinet for a global positioning system navigation receiver. 314,963, 2-26-91, Cl. D14-188.000.

Bethel, James A., Jr. Barbeque grill. 314,882, 2-26-91, Cl. D7-334.000.

Black & Decker, Inc.: *See*—
Naft, Stuart, 314,883, Cl. D7-379.000.

Blazek, Robert J. Masonry line block. 314,920, 2-26-91, Cl. D10-61.000.

Bonomi, Bortolo, to AGHIFUG S.p.A. Tongs. 314,889, 2-26-91, Cl. D7-687.000.

Bradd, Sidney H., to Hoover Company, The. Vacuum cleaner. 315,041, 2-26-91, Cl. D32-21.000.

Brawne, Nick: *See—*
Vu, Tuan T.; Lee, Michael J.; Salimpour, Siamak; Yurkonis, Philip G.; Pfeifer, Herbert; Brawne, Nick; and Hsiao, Howell, 314,950, Cl. D14-102.000.
Brengel, Wayne W. R. Hermetically sealable cover for golf clubs and bag. 314,863, 2-26-91, Cl. D3-37.000.
Bridgestone Corporation: *See—*
Goto, Akihito; and Nakano, Minoru, 314,933, Cl. D12-146.000.
Brooks, Daniel W. Combined spray head and bottle closure. 314,916, 2-26-91, Cl. D9-448.000.
Brown, Paula C. Gingerbread house. 314,854, 2-26-91, Cl. D1-106.000.
Brunner, Donald A. Serving tray or the like. 314,885, 2-26-91, Cl. D7-554.000.
Bush Industries, Inc.: *See—*
Bush, Paul; and Anderson, Bruce O., 314,877, Cl. D6-479.000.
Bush, Paul; and Anderson, Bruce O., to Bush Industries, Inc. Bookcase. 314,877, 2-26-91, Cl. D6-479.000.
Calayan, Carolina: *See—*
Puglisi, Salvatore A.; and Calayan, Carolina, 314,855, Cl. D1-127.000.
Callinan, Christopher J., to Regent Sheffield, Ltd. Package. 314,914, 2-26-91, Cl. D9-432.000.
Camacho, Jeffrey F., to Artifax Design International Corporation. Seat. 314,868, 2-26-91, Cl. D6-334.000.
Cangianni, Joe; and Colodner, Jesse L., to Cangianni, Joe. Emergency sign. 314,983, 2-26-91, Cl. D20-10.000.
Canon Kabushiki Kaisha: *See—*
Katada, Yoshie, 314,975, Cl. D18-37.000.
Yamamoto, Ei, 314,973, Cl. D18-22.000.
Carugati, Gloria A. Applicator for lotions. 315,033, 2-26-91, Cl. D28-7.000.
Casio Computer Co., Ltd.: *See—*
Miyahara, Akihiro; Nakatsuka, Hiroshi; and Sasaki, Asao, 314,958, Cl. D14-126.000.
Castonguay, Bertin; and Ratte, Alain, to Groupe Permacon Inc. Molded curb-stone. 315,026, 2-26-91, Cl. D25-113.000.
Cermak, Stephen, III; Hoeft, Manville A.; Zylka, Lawrence C.; Reshanov, Eugene N.; and Mueller, Eric J., to Cray Research, Inc. Computer cabinet. 314,949, 2-26-91, Cl. D14-102.000.
Cesaroni, William C.: *See—*
Wondergem, Martin J.; and Cesaroni, William C., 314 881, Cl. D7-309.000.
Chan, Raymond, to Integrated Display Technology Limited. Ultrasonic measuring instrument. 314,923, 2-26-91, Cl. D10-70.000.
Chia, Cheo: *See—*
Chia, Meang; and Chia, Cheo, 314,929, Cl. D11-6.000.
Chia, Meang; and Chia, Cheo. Bracelet or the like. 314,929, 2-26-91, Cl. D11-6.000.
Chrysler Corporation: *See—*
Magic, Andrew D.; Klein, Frank H.; McCauley, Gilbert L.; and Slanec, Thomas C., 314,966, Cl. D14-258.000.
Chung, Chanhong, to Myoung Jung Electronics Co., Ltd. Radio receiver. 314,964, 2-26-91, Cl. D14-192.000.
Clark, Fred C., to Lot-A-Wata, Inc. Combined automatic pet waterer and feeder. 315,037, 2-26-91, Cl. D30-122.000.
Clivio, Franco, to Gardena Kress & Kastner GmbH. Sprayer. 315,014, 2-26-91, Cl. D23-226.000.
Collins, Roger B. Offset wheel axle extension for vehicle. 314,935, 2-26-91, Cl. D12-160.000.
Colodner, Jesse L.: *See—*
Cangianni, Joe; and Colodner, Jesse L., 314,983, Cl. D20-10.000.
Combi Co., Ltd.: *See—*
Takahashi, Takehiko; Ishii, Yoshiyasu; and Hanashima, Taira, 314,986, Cl. D21-64.000.
Compaq Computer Corporation: *See—*
Good..ch, Donald S., 314,946, Cl. D14-100.000.
Compuadd Corporation: *See—*
Welch, Robert A., 314,953, Cl. D14-115.000.
Welch, Robert A., 314,954, Cl. D14-115.000.
Corby, Michael P. Applicator for injecting medicament into cow teats. 315,022, 2-26-91, Cl. D24-63.000.
Cray Research, Inc.: *See—*
Cermak, Stephen, III; Hoeft, Manville A.; Zylka, Lawrence C.; Reshanov, Eugene N.; and Mueller, Eric J., 314,949, Cl. D14-102.000.
Dean, Steven J.; Morton, David M.; Reshanov, Eugene N.; and Mueller, Eric J., 314,948, Cl. D14-102.000.
Creed, Kenny D. Table top hook for purse or similar article. 314,864, 2-26-91, Cl. D3-54.000.
Crestmoore Ltd.: *See—*
Platek, Avner, 315,034, Cl. D28-10.000.
Cuno Incorporated: *See—*
Petrucci, Raymond M.; Taylor, Bruce G.; Giordano, Edward C.; Padilla, James M.; and Palmer, Carl, 315,013, Cl. D23-209.000.
Daiwa Seiko, Inc.: *See—*
Kameda, Yasuhisa; and Asano, Shinichi, 315,011, Cl. D22-140.000.
Dallaire, Michel: *See—*
Aspri, Roberto; Maufette, Claude; and Dallaire, Michel, 314,968, Cl. D17-20.000.
Dart Industries Inc.: *See—*
Wondergem, Martin J.; and Cesaroni, William C., 314,881, Cl. D7-309.000.
Davidson, Grant M. N., to U.S. Philips Corporation. Car radio receiver. 314,961, 2-26-91, Cl. D14-157.000.
Dean, Steven J.; Morton, David M.; Reshanov, Eugene N.; and Mueller, Eric J., to Cray Research, Inc. Computer cabinet. 314,948, 2-26-91, Cl. D14-102.000.
Delaware Capital Formation, Inc.: *See—*
Ruffley, Douglas; and Midkiff, Gregory, 314,903, Cl. D8-310.000.
Denninger, Valentine L.: *See—*
Best, Melvin H. M.; Denninger, Valentine L.; Tang, John G.; Weber, Lynn; Janowski, Paul K.; and Stavros, Andrew, 314,963, Cl. D14-188.000.
Design Institute America, Inc.: *See—*
Berry, Richard D., Jr., 315,031, Cl. D26-105.000.
Diaz, Rolando: *See—*
Frosceno, Michael A.; Diaz, Rolando; and Lucas, Phillip D., 315,021, Cl. D24-47.000.
Doherty, Robert G.: *See—*
Orchard, Anthony R.; Matwey, Paul; Samuels, Lloyd A.; Fisher, Brian K.; and Doherty, Robert G., 314,952, Cl. D14-113.000.
Doskocil Manufacturing Company, Inc.: *See—*
VanSkiver, Ralph, 314,910, Cl. D8-359.000.
Dumas, Jean-Louis. Wristwatch. 314,918, 2-26-91, Cl. D10-32.000.
Duracraft Corporation: *See—*
Wang, Jui-Shang, 315,018, Cl. D23-382.000.
Eldon Industries, Inc.: *See—*
Evenson, Mel, 314,982, Cl. D19-99.000.
Engel, Hartmut S., to August Froscher GmbH & Co. K.G., a part interest. Chair. 314,872, 2-26-91, Cl. D6-380.000.
Enomoto, Nobuyuki: *See—*
Mano, Kaori; and Enomoto, Nobuyuki, 314,888, Cl. D7-605.000.
Entratter, Lynda G. Combined chair and audio unit. 314,869, 2-26-91, Cl. D6-335.000.
Evenson, Mel, to Eldon Industries, Inc. Rotating base for a file assembly. 314,982, 2-26-91, Cl. D19-99.000.
Fabrique Ebel, Societe Anonyme: *See—*
Schoepfer, Eddy, 314,928, Cl. D10-131.000.
Ferbrache, Joseph W. Decorative box. 314,913, 2-26-91, Cl. D9-430.000.
Fisher, Brian K.: *See—*
Orchard, Anthony R.; Matwey, Paul; Samuels, Lloyd A.; Fisher, Brian K.; and Doherty, Robert G., 314,952, Cl. D14-113.000.
Freeman, Thomas R., to Paragon Classics, Inc. Badge shield. 314,930, 2-26-91, Cl. D11-96.000.
Frosceno, Michael A.; Diaz, Rolando; and Lucas, Phillip D. Baby bottle. 315,021, 2-26-91, Cl. D24-47.000.
Fuji Photo Film Co., Ltd.: *See—*
Takahashi, Mikio; and Fukuda, Masahiro, 314,967, Cl. D16-246.000.
Fujii, Masahiro: *See—*
Nakamura, Osamu; Kamijo, Masahiro; and Fujii, Masahiro, 314,971, Cl. D18-12.000.
Fujimoto, Munenori: *See—*
Takayama, Hajime; Tomachi, Hidenori; Okano, Hiroshi; Asano, Kiyoshi; Koda, Hironosuke; and Fujimoto, Munenori, 314,931, Cl. D14-118.000.
Fukuda, Masahiro: *See—*
Takahashi, Mikio; and Fukuda, Masahiro, 314,967, Cl. D16-246.000.
Gardena Kress & Kastner GmbH: *See—*
Clivio, Franco, 315,014, Cl. D23-226.000.
Garrett, Lamills A. Hot dog bun for two hot dogs. 314,853, 2-26-91, Cl. D1-101.000.
GEC Plessey Telecommunications Limited: *See—*
Langton, Carlton M., 314,965, Cl. D14-241.000.
Geneve, Francois; Heiligenstein, Luc; and Melamed, Stephen, to Associated Mills, Inc. Wall mounted shower head. 315,015, 2-26-91, Cl. D23-229.000.
Gilmer, Allen P. Fish scaler. 314,890, 2-26-91, Cl. D7-693.000.
Giordano, Edward C.: *See—*
Petrucci, Raymond M.; Taylor, Bruce G.; Giordano, Edward C.; Padilla, James M.; and Palmer, Carl, 315,013, Cl. D23-209.000.
Goetz, Charles R., to Alco Industries Inc. Foldable chair. 314,871, 2-26-91, Cl. D6-368.000.
Gold Star Co., Ltd.: *See—*
Yang, Doo S., 314,960, Cl. D14-135.000.
Gonzales, Michael H. Writing instrument. 314,979, 2-26-91, Cl. D19-51.000.
Goodman, Sheldon; and Greenhut, Steven E. Clothes hanger holder. 314,867, 2-26-91, Cl. D6-324.000.
Goodrich, Donald S., to Compaq Computer Corporation. Personal computer. 314,946, 2-26-91, Cl. D14-100.000.
Goto, Akihito; and Nakano, Minoru, to Bridgestone Corporation. Automobile tire. 314,933, 2-26-91, Cl. D12-146.000.
Grant, Rick D.; Moore, Wayne E.; Penman, Tom J.; and Truscott, Ronald K., to O'Ryan Industries. Submersible pool light. 315,028, 2-26-91, Cl. D26-24.000.
Greenhut, Steven E.: *See—*
Goodman, Sheldon; and Greenhut, Steven E., 314,867, Cl. D6-324.000.
Grey, Jonathan, to Smallbone plc. Decorative ceiling arch. 315,024, 2-26-91, Cl. D25-58.000.
Grinberg, Gedalio; and Berger, Hugo, to North American Watch Corporation. Wrist watch dial. 314,927, 2-26-91, Cl. D10-126.000.
Groupe Permacon Inc.: *See—*
Castonguay, Bertin; and Ratte, Alain, 315,026, Cl. D25-113.000.
Gruber, Alfred: *See—*
Heffe-Sander, Hans-Georg; and Gruber, Alfred, 314,856, Cl. D2-215.000.

Hall, Craig. Collapsible sawhorse. 315,025, 2-26-91, Cl. D25-67.000.
Hanashima, Taira: *See—*
Takahashi, Takehiko; Ishii, Yoshiyasu; and Hanashima, Taira, 314,986, Cl. D21-64.000.
Hang Tjuk Industrial Co., Ltd.: *See—*
Kwan, Cheng L., 315,029, Cl. D26-42.000.
Harden Industries, Inc.: *See—*
Razumov, Regina, 315,016, Cl. D23-255.000.
Harris Corporation: *See—*
Sohay, Leslie I., 314,926, Cl. D10-78.000.
Harrod, Lawrence R., to Kransco. Toy vehicle with canopy. 314,997, 2-26-91, Cl. D21-134.000.
Harsco Corp.: *See—*
Trinkwalder, Joseph C., Jr., 314,904, Cl. D8-312.000.
Hart, Richard S., to Soft Sheen Products, Inc. Table. 314,878, 2-26-91, Cl. D6-486.000.
Hass, David J. Hangtag. 314,984, 2-26-91, Cl. D20-22.000.
Hassel, H. Charles, to MicroComputer Accessories, Inc. File box. 314,981, 2-26-91, Cl. D19-75.000.
Hatting, Jan; and Poulsen, Ole V., to Interlego A.G. Toy building element. 314,993, 2-26-91, Cl. D21-108.000.
Hatting, Jan: *See—*
Poulsen, Ole V.; and Hatting, Jan, 314,995, Cl. D21-108.000.
Hayden, Theodore R. Central vacuum system hose handle. 315,043, 2-26-91, Cl. D32-34.000.
Hayes, Kiel R. Pipe. 315,032, 2-26-91, Cl. D27-163.000.
Haynes, Charles W., to Martin-Decker, Inc. Jaw insert for power tongs. 314,896, 2-26-91, Cl. D8-22.000.
Heffe-Sander, Hans-Georg; and Gruber, Alfred. Shirt. 314,856, 2-26-91, Cl. D2-215.000.
Heiligenstein, Luc: *See—*
Geneve, Francois; Heiligenstein, Luc; and Melamed, Stephen, 315,015, Cl. D23-229.000.
Hill, Dale R. Frame for holding garbage and trash bags. 315,044, 2-26-91, Cl. D34-10.000.
Hilton, M. Allyson, to Quaker Oats Company, The. Public address unit. 314,962, 2-26-91, Cl. D14-185.000.
Hino, Shinsaku: *See—*
Osaka, Kazumi; Hino, Shinsaku; and Wada, Tatsumi, 314,972, Cl. D18-13.000.
Hirose Electric Co., Ltd.: *See—*
Sato, Kensaku; and Akiyama, Koichi, 314,942, Cl. D13-147.000.
Hoeft, Manville A.: *See—*
Cermak, Stephen, III; Hoeft, Manville A.; Zylka, Lawrence C.; Reshanov, Eugene N.; and Mueller, Eric J., 314,949, Cl. D14-102.000.
Hoese Corporation: *See—*
Hoese, Fred O., 314,932, Cl. D12-114.000.
Hoese, Fred O., to Hoese Corporation. Motorcycle radio cover. 314,932, 2-26-91, Cl. D12-114.000.
Hoffman, Roger T., to National-Detroit, Inc. Abrading machine. 314,900, 2-26-91, Cl. D8-62.000.
Hoover Company, The: *See—*
Bradd, Sidney H., 315,041, Cl. D32-21.000.
Horowitz, Michael C. Navigational aid. 314,921, 2-26-91, Cl. D10-62.000.
Hoshino Gakki Co., Ltd.: *See—*
Nakayama, Masamichi; and Hoshino, Yoshiki, 314,969, Cl. D17-22.000.
Hoshino, Yoshiki: *See—*
Nakayama, Masamichi; and Hoshino, Yoshiki, 314,969, Cl. D17-22.000.
Hosiden Electronics Co., Ltd.: *See—*
Amachi, Ryousuke; and Tanaka, Masanori, 314,941, Cl. D13-133.000.
Tajima, Kyousuke, 314,943, Cl. D13-147.000.
Howes, James P. Foldable vehicle windshield protector. 314,934, 2-26-91, Cl. D12-155.000.
Hsiao, Howell: *See—*
Vu, Tuan T.; Lee, Michael J.; Salimpour, Siamak; Yurkonis, Philip G.; Pfeifer, Herbert; Brawne, Nick; and Hsiao, Howell, 314,950, Cl. D14-102.000.
Huang, David. Dumbbell. 315,003, 2-26-91, Cl. D21-197.000.
Huang, Harrison. Letter opener. 314,902, 2-26-91, Cl. D8-102.000.
Hung, Jackson. Stapler. 314,897, 2-26-91, Cl. D8-50.000.
IDN Inventions and Development of Novelties AG: *See—*
Ackeret, Peter A., 314,861, Cl. D3-35.000.
Ikeda, Matafumi, to Sharp Corporation. Vacuum cleaner. 315,042, 2-26-91, Cl. D32-22.000.
Imamura, Tetsuya, to Matsushita Electric Industrial Co., Ltd. Central processing unit for a computer. 314,947, 2-26-91, Cl. D14-100.000.
Ingalls, Albert A. Combined golf tool and coin holder. 315,009, 2-26-91, Cl. D21-234.000.
Integrated Display Technology Limited: *See—*
Chan, Raymond, 314,923, Cl. D10-70.000.
Interlego AG: *See—*
Berggren, Ib H., 314,998, Cl. D21-134.000.
Olsen, Flemming H., 314,988, Cl. D21-108.000.
Olsen, Flemming H., 314,996, Cl. D21-108.000.
Stephensen, Christian; and Nielsen, Jacob, 315,000, Cl. D21-156.000.
Interlego A.G.: *See—*
Hatting, Jan; and Poulsen, Ole V., 314,993, Cl. D21-108.000.
Olsen, Flemming H., 314,989, Cl. D21-108.000.
Poulsen, Ole V., 314,994, Cl. D21-108.000.
Poulsen, Ole V.; and Hatting, Jan, 314,995, Cl. D21-108.000.
Refsing, Arne, 314,990, Cl. D21-108.000.
Ryaa, Jan, 314,991, Cl. D21-108.000.
Spangsberg, Stig, 314,992, Cl. D21-108.000.
Ipco Corp.: *See—*
Miller, Alan, 315,040, Cl. D32-1.000.
Isherwood, Peter W., to Offshore Instruments Limited. Boat turning block. 314,906, 2-26-91, Cl. D8-360.000.
Ishii, Yoshiyasu: *See—*
Takahashi, Takehiko; Ishii, Yoshiyasu; and Hanashima, Taira, 314,986, Cl. D21-64.000.
Jacobs, Harold L. Drive belt adjustment tool. 314,894, 2-26-91, Cl. D8-14.000.
Jacobs, Richard H.; Keagle, Ronald T.; Peterson, Gerald E.; and Beachy, Robert W., to Toro Company, The. Mini-spotlight. 315,030, 2-26-91, Cl. D26-63.000.
Janowski, Paul K.: *See—*
Best, Melvin H. M.; Denninger, Valentine L.; Tang, John G.; Weber, Lynn; Janowski, Paul K.; and Stavros, Andrew, 314,963, Cl. D14-188.000.
Japan Oxygen Co., Ltd.: *See—*
Mano, Kaori; and Enomoto, Nobuyuki, 314,888, Cl. D7-605.000.
Jenn, Louis J., to Atrium Structures, Inc. Dual cruciform structure. 315,023, 2-26-91, Cl. D25-17.000.
Jones, William A. Tool for repairing a break in glass. 314,893, 2-26-91, Cl. D8-14.000.
Juergens, David A., to Rubbermaid Commerical Products Inc. Dunnage rack. 314,875, 2-26-91, Cl. D6-449.000.
Kameda, Yasuhisa; and Asano, Shinichi, to Daiwa Seiko, Inc. Fishing reel. 315,011, 2-26-91, Cl. D22-140.000.
Kamijo, Masahiro: *See—*
Nakamura, Osamu; Kamijo, Masahiro; and Fujii, Masahiro, 314,971, Cl. D18-12.000.
Karsten Manufacturing Corporation: *See—*
Solheim, Karsten, 315,005, Cl. D21-219.000.
Solheim, Karsten, 315,006, Cl. D21-222.000.
Katada, Yoshie, to Canon Kabushiki Kaisha. Copying machine. 314,975, 2-26-91, Cl. D18-37.000.
Kataoka, Isamu, to Takara Co., Ltd. Motor driven toy flower. 314,999, 2-26-91, Cl. D21-150.000.
Kauhajoen Mainostuote Oy: *See—*
Tuisku, Jaakko, 314,865, Cl. D3-56.000.
Kawamura, Masaki: *See—*
Sakaguchi, Hiroshi; and Kawamura, Masaki, 315,019, Cl. D24-21.000.
Sakaguchi, Hiroshi; and Kawamura, Masaki, 315,020, Cl. D24-21.000.
Keagle, Ronald T.: *See—*
Jacobs, Richard H.; Keagle, Ronald T.; Peterson, Gerald E.; and Beachy, Robert W., 315,030, Cl. D26-63.000.
Kehm, Bruce L. Residential water well pump pulley. 314,905, 2-26-91, Cl. D8-360.000.
Kellogg Plastics, Ltd.: *See—*
Rumpel, Donald D., 314,895, Cl. D8-14.000.
Klein, Frank H.: *See—*
Magic, Andrew D.; Klein, Frank H.; McCauley, Gilbert L.; and Slanec, Thomas C., 314,966, Cl. D14-258.000.
Kobayashi Manufacturing Company, Ltd.: *See—*
Sata, Shigenori, 314,891, Cl. D7-698.000.
Sata, Shigenori, 314,892, Cl. D7-698.000.
Koda, Hironosuke: *See—*
Takayama, Hajime; Tomachi, Hidenori; Okano, Hiroshi; Asano, Kiyoshi; Koda, Hironosuke; and Fujimoto, Munenori, 314,931, Cl. D14-118.000.
Koga, Howard D. Fishing rod holder. 315,012, 2-26-91, Cl. D22-147.000.
Kohno, Kenichiro, to Sony Corporation. Video tape recorder. 314,959, 2-26-91, Cl. D14-135.000.
Kovats, John J., to Space Adventures, Inc. Toy kite. 314,987, 2-26-91, Cl. D21-89.000.
Kransco: *See—*
Harrod, Lawrence R., 314,997, Cl. D21-134.000.
Kronos - Central Products, Inc.: *See—*
Tomaras, Chris, 314,887, Cl. D7-601.000.
Kwan, Cheng L., to Hang Tjuk Industrial Co., Ltd. Portable fluorescent lamp. 315,029, 2-26-91, Cl. D26-42.000.
Lachonius, Leif: *See—*
Abbestam, Goran; and Lachonius, Leif, 315,027, Cl. D25-124.000.
Langton, Carlton M., to GEC Plessey Telecommunications Limited. Telephone console. 314,965, 2-26-91, Cl. D14-241.000.
Lawassani, Abdi R.; and Wasik, Mark J., to United Technologies Automotive. Visor. 314,936, 2-26-91, Cl. D12-191.000.
Lee, Michael J.: *See—*
Vu, Tuan T.; Lee, Michael J.; Salimpour, Siamak; Yurkonis, Philip G.; Pfeifer, Herbert; Brawne, Nick; and Hsiao, Howell, 314,950, Cl. D14-102.000.
Lenclos, Jean-Philippe, to Produits Ceramiques de Touraine. Combined water closet and seat. 315,017, 2-26-91, Cl. D23-301.000.
Leopold, Lynnabeth. Hairband. 315,036, 2-26-91, Cl. D28-41.000.
Les Entreprises Roberto Aspri Ltee: *See—*
Aspri, Roberto; Maufette, Claude; and Dallaire, Michel, 314,968, Cl. D17-20.000.
Leung, Donny, to Video Technology Industries, Inc. Electronic learning aid. 314,980, 2-26-91, Cl. D19-60.000.
Lewis, Henry. Battery Corrosion Eliminator. 314,940, 2-26-91, Cl. D13-119.000.

Loredo, Isidoro. Organizer for racing form and other items. 314,976, 2-26-91, Cl. D19-26.000.
Lot-A-Wata, Inc.: *See—*
Clark, Fred C., 315,037, Cl. D30-122.000.
Lucas, Phillip D.: *See—*
Frosceno, Michael A.; Diaz, Rolando; and Lucas, Phillip D., 315,021, Cl. D24-47.000.
Magic, Andrew D.; Klein, Frank H.; McCauley, Gilbert L.; and Slanec, Thomas C., to Chrysler Corporation. Control unit for a combined car radio receiver cassett player and digital clock. 314,966, 2-26-91, Cl. D14-258.000.
Mano, Kaori; and Enomoto, Nobuyuki, to Japan Oxygen Co., Ltd. Vacuum bottle. 314,888, 2-26-91, Cl. D7-605.000.
Martin-Decker, Inc.: *See—*
Haynes, Charles W., 314,896, Cl. D8-22.000.
Matsushita Electric Industrial Co., Ltd.: *See—*
Imamura, Tetsuya, 314,947, Cl. D14-100.000.
Matsushita Graphic Communication Systems, Inc.: *See—*
Takayama, Hajime; Tomachi, Hidenori; Okano, Hiroshi; Asano, Kiyoshi; Koda, Hironosuke; and Fujimoto, Munenori, 314,931, Cl. D14-118.000.
Matwey, Paul: *See—*
Orchard, Anthony R.; Matwey, Paul; Samuels, Lloyd A.; Fisher, Brian K.; and Doherty, Robert G., 314,952, Cl. D14-113.000.
Maufette, Claude: *See—*
Aspri, Roberto; Maufette, Claude; and Dallaire, Michel, 314,968, Cl. D17-20.000.
McCarthy, Alfred F., to Aavid Engineering, Inc. Heat sink. 314,945, 2-26-91, Cl. D13-179.000.
McCauley, Gilbert L.: *See—*
Magic, Andrew D.; Klein, Frank H.; McCauley, Gilbert L.; and Slanec, Thomas C., 314,966, Cl. D14-258.000.
Mead Corporation, The: *See—*
Wyant, Jon R., 314,977, Cl. D19-27.000.
Melamed, Stephen: *See—*
Geneve, Francois; Heiligenstein, Luc; and Melamed, Stephen, 315,015, Cl. D23-229.000.
MicroComputer Accessories, Inc.: *See—*
Hassel, H. Charles, 314,981, Cl. D19-75.000.
Midkiff, Gregory: *See—*
Ruffley, Douglas; and Midkiff, Gregory, 314,903, Cl. D8-310.000.
Miller, Alan, to Ipco Corp. Ultrasonic cleaning machine. 315,040, 2-26-91, Cl. D32-1.000.
Miller, James R.: *See—*
Tetrault, Leonard P.; and Miller, James R., 314,939, Cl. D13-158.000.
Mirikitani, Andrew K.: *See—*
Weightman, Judy M.; and Mirikitani, Andrew K., 314,859, Cl. D2-639.000.
Miyahara, Akihiro; Nakatsuka, Hiroshi; and Sasaki, Asao, to Casio Computer Co., Ltd. Portable television set. 314,958, 2-26-91, Cl. D14-126.000.
Monneret, Alain, to Monneret Jouets. Game table. 314,985, 2-26-91, Cl. D21-11.000.
Monneret, Alain, to Monneret Jouets. Game table. 315,007, 2-26-91, Cl. D21-232.000.
Monneret Jouets: *See—*
Monneret, Alain, 314,985, Cl. D21-11.000.
Monneret, Alain, 315,007, Cl. D21-232.000.
Moore, Wayne E.: *See—*
Grant, Rick D.; Moore, Wayne E.; Penman, Tom J.; and Truscott, Ronald K., 315,028, Cl. D26-24.000.
Morton, David M.: *See—*
Dean, Steven J.; Morton, David M.; Reshanov, Eugene N.; and Mueller, Eric J., 314,948, Cl. D14-102.000.
Mourad, Miza: *See—*
Richard, Daniel; Spinney, K. Wayne; and Mourad, Miza, 314,858, Cl. D2-314.000.
Mueller, Eric J.: *See—*
Cermak, Stephen, III; Hoeft, Manville A.; Zylka, Lawrence C.; Reshanov, Eugene N.; and Mueller, Eric J., 314,949, Cl. D14-102.000.
Dean, Steven J.; Morton, David M.; Reshanov, Eugene N.; and Mueller, Eric J., 314,948, Cl. D14-102.000.
Murphy, Bernard J. Circuit tester. 314,925, 2-26-91, Cl. D10-78.000.
Musillo, Robert G. Golf tee driving gauge. 314,922, 2-26-91, Cl. D10-64.000.
Myoung Jung Electronics Co., Ltd.: *See—*
Chung, Chanhong, 314,964, Cl. D14-192.000.
Naft, Stuart, to Black & Decker, Inc. Food mixer. 314,883, 2-26-91, Cl. D7-379.000.
Nakamura, Osamu; Kamijo, Masahiro; and Fujii, Masahiro, to Seiko Epson Corporation. Ink ribbon cartridge. 314,971, 2-26-91, Cl. D18-12.000.
Nakano, Minoru: *See—*
Goto, Akihito; and Nakano, Minoru, 314,933, Cl. D12-146.000.
Nakatsuka, Hiroshi: *See—*
Miyahara, Akihiro; Nakatsuka, Hiroshi; and Sasaki, Asao, 314,958, Cl. D14-126.000.
Nakayama, Masamichi; and Hoshino, Yoshiki, to Hoshino Gakki Co., Ltd. Drum spur holder. 314,969, 2-26-91, Cl. D17-22.000.
National-Detroit, Inc.: *See—*
Hoffman, Roger T., 314,900, Cl. D8-62.000.
NCR Corporation: *See—*
Orchard, Anthony R.; Matwey, Paul; Samuels, Lloyd A.; Fisher, Brian K.; and Doherty, Robert G., 314,952, Cl. D14-113.000.
Newton, Milton A., Jr. Foot support block for runner. 315,004, 2-26-91, Cl. D21-199.000.
Nielsen, Jacob: *See—*
Stephensen, Christian; and Nielsen, Jacob, 315,000, Cl. D21-156.000.
North American Watch Corporation: *See—*
Grinberg, Gedalio; and Berger, Hugo, 314,927, Cl. D10-126.000.
Offshore Instruments Limited: *See—*
Isherwood, Peter W., 314,906, Cl. D8-360.000.
Oka, Shigeo, to Pentel Kabushiki Kaisha. Writing instrument. 314,978, 2-26-91, Cl. D19-48.000.
Okano, Hiroshi: *See—*
Takayama, Hajime; Tomachi, Hidenori; Okano, Hiroshi; Asano, Kiyoshi; Koda, Hironosuke; and Fujimoto, Munenori, 314,931, Cl. D14-118.000.
Olsen, Flemming H., to Interlego AG. Toy gate. 314,988, 2-26-91, Cl. D21-108.000.
Olsen, Flemming H., to Interlego A.G. Toy tree element. 314,989, 2-26-91, Cl. D21-108.000.
Olsen, Flemming H., to Interlego AG. Toy construction piece simulating a chute. 314,996, 2-26-91, Cl. D21-109.000.
Orchard, Anthony R.; Matwey, Paul; Samuels, Lloyd A.; Fisher, Brian K.; and Doherty, Robert G., to NCR Corporation. Video display terminal or similar article. 314,952, 2-26-91, Cl. D14-113.000.
O'Ryan Industries: *See—*
Grant, Rick D.; Moore, Wayne E.; Penman, Tom J.; and Truscott, Ronald K., 315,028, Cl. D26-24.000.
Osaka, Kazumi; Hino, Shinsaku; and Wada, Tatsumi, to Sharp Corporation. Combined printer and plug for word processor. 314,972, 2-26-91, Cl. D18-13.000.
Padilla, James M.: *See—*
Petrucci, Raymond M.; Taylor, Bruce G.; Giordano, Edward C.; Padilla, James M.; and Palmer, Carl, 315,013, Cl. D23-209.000.
Painter, James B. Pillow. 314,879, 2-26-91, Cl. D6-597.000.
Palmer, Carl: *See—*
Petrucci, Raymond M.; Taylor, Bruce G.; Giordano, Edward C.; Padilla, James M.; and Palmer, Carl, 315,013, Cl. D23-209.000.
Paragon Classics, Inc.: *See—*
Freeman, Thomas R., 314,930, Cl. D11-96.000.
Peart, Stephen. Printer stand. 314,974, 2-26-91, Cl. D18-23.000.
Pedersen, Jakob B., to A/S Ruko. Combined padlock and hasp protector. 314,908, 2-26-91, Cl. D8-334.000.
Penman, Tom J.: *See—*
Grant, Rick D.; Moore, Wayne E.; Penman, Tom J.; and Truscott, Ronald K., 315,028, Cl. D26-24.000.
Pentel Kabushiki Kaisha: *See—*
Oka, Shigeo, 314,978, Cl. D19-48.000.
Peterson, Gerald E.: *See—*
Jacobs, Richard H.; Keagle, Ronald T.; Peterson, Gerald E.; and Beachy, Robert W., 315,030, Cl. D26-63.000.
Petrucci, Raymond M.; Taylor, Bruce G.; Giordano, Edward C.; Padilla, James M.; and Palmer, Carl, to Cuno Incorporated. Head for a quick-change filter cartridge. 315,013, 2-26-91, Cl. D23-209.000.
Pfeifer, Herbert: *See—*
Vu, Tuan T.; Lee, Michael J.; Salimpour, Siamak; Yurkonis, Philip G.; Pfeifer, Herbert; Brawne, Nick; and Hsiao, Howell, 314,950, Cl. D14-102.000.
Phosphosherry Corporation S.A.: *See—*
Rey Pascual, Manuel E., 314,912, Cl. D9-424.000.
Platek, Avner, to Crestmoore Ltd. Housing for a depilator. 315,034, 2-26-91, Cl. D28-10.000.
Popovits, Frank J. Golf tee holding bag tag. 315,008, 2-26-91, Cl. D21-234.000.
Poulsen, Ole V., to Interlego A.G. Toy control panel element. 314,994, 2-26-91, Cl. D21-108.000.
Poulsen, Ole V.; and Hatting, Jan, to Interlego A.G. Toy building element. 314,995, 2-26-91, Cl. D21-108.000.
Poulsen, Ole V.: *See—*
Hatting, Jan; and Poulsen, Ole V., 314,993, Cl. D21-108.000.
Produits Ceramiques de Touraine: *See—*
Lenclos, Jean-Philippe, 315,017, Cl. D23-301.000.
Puglisi, Salvatore A.; and Calayan, Carolina, to Warner-Lambert Company. Confection. 314,855, 2-26-91, Cl. D1-127.000.
Quaker Oats Company, The: *See—*
Hilton, M. Allyson, 314,962, Cl. D14-185.000.
Quartermaine, Bonnie J. Shoe cabinet. 314,874, 2-26-91, Cl. D6-432.000.
Ratte, Alain: *See—*
Castonguay, Bertin; and Ratte, Alain, 315,026, Cl. D25-113.000.
Razumov, Regina, to Harden Industries, Inc. Spout. 315,016, 2-26-91, Cl. D23-255.000.
Refsing, Arne, to Interlego A.G. Toy building element. 314,990, 2-26-91, Cl. D21-108.000.
Regent Sheffield, Ltd.: *See—*
Callinan, Christopher J., 314,914, Cl. D9-432.000.
Rentsch, Freddie F. Beverage stirrer. 314,880, 2-26-91, Cl. D7-300.200.
Reshanov, Eugene N.: *See—*
Cermak, Stephen, III; Hoeft, Manville A.; Zylka, Lawrence C.; Reshanov, Eugene N.; and Mueller, Eric J., 314,949, Cl. D14-102.000.
Dean, Steven J.; Morton, David M.; Reshanov, Eugene N.; and Mueller, Eric J., 314,948, Cl. D14-102.000.
Wenger, Kari J.; and Reshanov, Eugene N., 314,873, Cl. D6-419.000.
Rey Pascual, Manuel E., to Phosphosherry Corporation S.A. Matchbox. 314,912, 2-26-91, Cl. D9-424.000.

Ricci, Stefano, to Battaglia Shops, Inc. Perfume bottle. 314,907, 2-26-91, Cl. D9-432.000.
Richard, Daniel; Spinney, K. Wayne; and Mourad, Miza, to Avia Group International, Inc. Shoe upper. 314,858, 2-26-91, Cl. D2-314.000.
Ricoh Company, Ltd.: *See—*
Watanabe, Hiroaki, 314,955, Cl. D14-118.000.
Royston Corporation: *See—*
Suttles, J. Marshall, 314,876, Cl. D6-469.000.
Rubbermaid Commerical Products Inc.: *See—*
Juergens, David A., 314,875, Cl. D6-449.000.
Ruffley, Douglas; and Midkiff, Gregory, to Delaware Capital Formation, Inc. Handle for a clamp. 314,903, 2-26-91, Cl. D8-310.000.
Rumpel, Donald D., to Kellogg Plastics, Ltd. Mastic spreader or like article. 314,895, 2-26-91, Cl. D8-14.000.
Rust, Robert R. Rain gutter rake. 314,898, 2-26-91, Cl. D8-51.000.
Ryaa, Jan, to Interlego A.G. Toy building element. 314,991, 2-26-91, Cl. D21-108.000.
S&C Electric Company: *See—*
Urbanek, John, 314,944, Cl. D13-160.000.
Sakaguchi, Hiroshi; and Kawamura, Masaki, to Sharp Corporation. Sphygmomanometer. 315,019, 2-26-91, Cl. D24-21.000.
Sakaguchi, Hiroshi; and Kawamura, Masaki, to Sharp Corporation. Sphygmomanometer. 315,020, 2-26-91, Cl. D24-21.000.
Salimpour, Siamak: *See—*
Vu, Tuan T.; Lee, Michael J.; Salimpour, Siamak; Yurkonis, Philip G.; Pfeifer, Herbert; Brawne, Nick; and Hsiao, Howell, 314,950, Cl. D14-102.000.
Samuels, Lloyd A.: *See—*
Orchard, Anthony R.; Matwey, Paul; Samuels, Lloyd A.; Fisher, Brian K.; and Doherty, Robert G., 314,952, Cl. D14-113.000.
Sasaki, Asao: *See—*
Miyahara, Akihiro; Nakatsuka, Hiroshi; and Sasaki, Asao, 314,958, Cl. D14-126.000.
Sata, Shigenori, to Kobayashi Manufacturing Company, Ltd. Chopping board. 314,891, 2-26-91, Cl. D7-698.000.
Sata, Shigenori, to Kobayashi Manufacturing Company, Ltd. Chopping board. 314,892, 2-26-91, Cl. D7-698.000.
Sato, Kensaku; and Akiyama, Koichi, to Hirose Electric Co., Ltd. Electrical connector housing. 314,942, 2-26-91, Cl. D13-147.000.
Schmidt, Walter A. Ski rope reel or the like. 314,909, 2-26-91, Cl. D8-358.000.
Schoepfer, Eddy, to Fabrique Ebel, Societe Anonyme. Watch crown. 314,928, 2-26-91, Cl. D10-131.000.
Scott, Joel E. Camera strap attachable note pad container. 314,866, 2-26-91, Cl. D3-100.000.
Seiko Epson Corporation: *See—*
Nakamura, Osamu; Kamijo, Masahiro; and Fujii, Masahiro, 314,971, Cl. D18-12.000.
Servo Corporation of America: *See—*
Villar, Luis F., 314,919, Cl. D10-46.000.
Sharp Corporation: *See—*
Ikeda, Matafumi, 315,042, Cl. D32-22.000.
Osaka, Kazumi; Hino, Shinsaku; and Wada, Tatsumi, 314,972, Cl. D18-13.000.
Sakaguchi, Hiroshi; and Kawamura, Masaki, 315,019, Cl. D24-21.000.
Sakaguchi, Hiroshi; and Kawamura, Masaki, 315,020, Cl. D24-21.000.
Tomoike, Maki, 314,970, Cl. D18-4.000.
Tsukada, Akira, 314,956, Cl. D14-118.000.
Tsukada, Akira, 314,957, Cl. D14-118.000.
SKF Specialty Products AB: *See—*
Abbestam, Goran; and Lachonius, Leif, 315,027, Cl. D25-124.000.
Slanec, Thomas C.: *See—*
Magic, Andrew D.; Klein, Frank H.; McCauley, Gilbert L.; and Slanec, Thomas C., 314,966, Cl. D14-258.000.
Smallbone plc: *See—*
Grey, Jonathan, 315,024, Cl. D25-58.000.
Soft Sheen Products, Inc.: *See—*
Hart, Richard S., 314,878, Cl. D6-486.000.
Sohay, Leslie I., to Harris Corporation. Portable line tester or similar article. 314,926, 2-26-91, Cl. D10-78.000.
Solheim, Karsten, to Karsten Manufacturing Corporation. Golf putter head. 315,005, 2-26-91, Cl. D21-219.000.
Solheim, Karsten, to Karsten Manufacturing Corporation. Golf club grip. 315,006, 2-26-91, Cl. D21-222.000.
Sony Corporation: *See—*
Kohno, Kenichiro, 314,959, Cl. D14-135.000.
Space Adventures, Inc.: *See—*
Kovats, John J., 314,987, Cl. D21-89.000.
Spangsberg, Stig, to Interlego A.G. Toy ghost. 314,992, 2-26-91, Cl. D21-108.000.
Spica, Joseph P., to 2500 Corporation, The. Support for signal flags or the like. 314,911, 2-26-91, Cl. D8-373.000.
Spinney, K. Wayne: *See—*
Richard, Daniel; Spinney, K. Wayne; and Mourad, Miza, 314,858, Cl. D2-314.000.
Stavros, Andrew: *See—*
Best, Melvin H. M.; Denninger, Valentine L.; Tang, John G.; Weber, Lynn; Janowski, Paul K.; and Stavros, Andrew, 314,963, Cl. D14-188.000.
Stephensen, Christian; and Nielsen, Jacob, to Interlego AG. Toy monkey. 315,000, 2-26-91, Cl. D21-156.000.
Sterling Drug Inc.: *See—*
Thompson, Joseph, 314,915, Cl. D9-435.000.
Thompson, Joseph, 314,917, Cl. D9-448.000.
Stevens, Debra A. Flotation device. 315,010, 2-26-91, Cl. D21-238.000.
Stevenson, Lovena M. Glove cover for attachment to a ski pole. 314,862, 2-26-91, Cl. D3-36.000.
Strickler, Fletcher C. Brush for animals. 315,038, 2-26-91, Cl. D30-158.000.
Sun Microsystems: *See—*
Vu, Tuan T.; Lee, Michael J.; Salimpour, Siamak; Yurkonis, Philip G.; Pfeifer, Herbert; Brawne, Nick; and Hsiao, Howell, 314,950, Cl. D14-102.000.
Suttles, J. Marshall, to Royston Corporation. Combined storage and cup dispenser unit. 314,876, 2-26-91, Cl. D6-469.000.
Swartz, Jerome, to Symbol Technologies, Inc. Countertop optical scanner with credit card reader. 314,951, 2-26-91, Cl. D14-107.000.
Symbol Technologies, Inc.: *See—*
Swartz, Jerome, 314,951, Cl. D14-107.000.
Syracuse China Corporation: *See—*
Unger, Steve A., 314,884, Cl. D7-545.000.
Tackett, Edd; and Armstrong, Yvonne K. Fence wire winding tool. 314,901, 2-26-91, Cl. D8-89.000.
Tajima, Kyousuke, to Hosiden Electronics Co. Ltd. Connector socket. 314,943, 2-26-91, Cl. D13-147.000.
Takahashi, Mikio; and Fukuda, Masahiro, to Fuji Photo Film Co., Ltd. Printer processor for making photographic prints. 314,967, 2-26-91, Cl. D16-246.000.
Takahashi, Takehiko; Ishii, Yoshiyasu; and Hanashima, Taira, to Combi Co., Ltd. Toy saxophone. 314,986, 2-26-91, Cl. D21-64.000.
Takara Co., Ltd.: *See—*
Kataoka, Isamu, 314,999, Cl. D21-150.000.
Takayama, Hajime; Tomachi, Hidenori; Okano, Hiroshi; Asano, Kiyoshi; Koda, Hironosuke; and Fujimoto, Munenori, to Matsushita Graphic Communication Systems, Inc. Facsimile transceiver. 314,931, 2-26-91, Cl. D14-118.000.
Tanaka, Masanori: *See—*
Amachi, Ryusuke; and Tanaka, Masanori, 314,941, Cl. D13-133.000.
Tang, John G.: *See—*
Best, Melvin H. M.; Denninger, Valentine L.; Tang, John G.; Weber, Lynn; Janowski, Paul K.; and Stavros, Andrew, 314,963, Cl. D14-188.000.
Taylor, Bruce G.: *See—*
Petrucci, Raymond M.; Taylor, Bruce G.; Giordano, Edward C.; Padilla, James M.; and Palmer, Carl, 315,013, Cl. D23-209.000.
Tetrault, Leonard P.; and Miller, James R., to Aerodyne Controls Corporation. Tilt switch. 314,939, 2-26-91, Cl. D13-158.000.
Thompson, Joseph, to Sterling Drug Inc. Bottle closure. 314,915, 2-26-91, Cl. D9-435.000.
Thompson, Joseph, to Sterling Drug Inc. Combined overcap and aerosol actuator. 314,917, 2-26-91, Cl. D9-448.000.
Tomachi, Hidenori: *See—*
Takayama, Hajime; Tomachi, Hidenori; Okano, Hiroshi; Asano, Kiyoshi; Koda, Hironosuke; and Fujimoto, Munenori, 314,931, Cl. D14-118.000.
Tomaras, Chris, to Kronos - Central Products, Inc. Pita sandwich holder. 314,887, 2-26-91, Cl. D7-601.000.
Tomoike, Maki, to Sharp Corporation. Cash register. 314,970, 2-26-91, Cl. D18-4.000.
Toro Company, The: *See—*
Jacobs, Richard H.; Keagle, Ronald T.; Peterson, Gerald E.; and Beachy, Robert W., 315,030, Cl. D26-63.000.
Trimble Navigation, Ltd.: *See—*
Best, Melvin H. M.; Denninger, Valentine L.; Tang, John G.; Weber, Lynn; Janowski, Paul K.; and Stavros, Andrew, 314,963, Cl. D14-188.000.
Trinkwalder, Joseph C., Jr., to Harsco Corp. Handle for scuba equipment valve or the like. 314,904, 2-26-91, Cl. D8-312.000.
Truscott, Ronald K.: *See—*
Grant, Rick D.; Moore, Wayne E.; Penman, Tom J.; and Truscott, Ronald K., 315,028, Cl. D26-24.000.
Tsukada, Akira, to Sharp Corporation. Facsimile. 314,956, 2-26-91, Cl. D14-118.000.
Tsukada, Akira, to Sharp Corporation. Facsimile. 314,957, 2-26-91, Cl. D14-118.000.
Tucker, Sharon D. Hair dryer unit. 315,035, 2-26-91, Cl. D28-12.000.
Tuisku, Jaakko, to Kauhajoen Mainostuote Oy. Credit card case. 314,865, 2-26-91, Cl. D3-56.000.
Unger, Steve A., to Syracuse China Corporation. Serving plate or similar article. 314,884, 2-26-91, Cl. D7-545.000.
U.S. Philips Corporation: *See—*
Davidson, Grant M. N., 314,961, Cl. D14-157.000.
United Technologies Automotive: *See—*
Lawassani, Abdi R.; and Wasik, Mark J., 314,936, Cl. D12-191.000.
Urbanek, John, to S&C Electric Company. Interrupter unit for a switch assembly. 314,944, 2-26-91, Cl. D13-160.000.
Vanaman, Cynthia L. Data box for a house for sale. 315,045, 2-26-91, Cl. D99-30.000.
VanSkiver, Ralph, to Doskocil Manufacturing Company, Inc. Cord storage reel. 314,910, 2-26-91, Cl. D8-359.000.
Video Technology Industries, Inc.: *See—*
Leung, Donny, 314,980, Cl. D19-60.000.
Villar, Luis F., to Servo Corporation of America. Hot box detector scanner housing. 314,919, 2-26-91, Cl. D10-46.000.
Vossler, Roy L. Hat. 314,857, 2-26-91, Cl. D2-257.000.
Vu, Tuan T.; Lee, Michael J.; Salimpour, Siamak; Yurkonis, Philip G.; Pfeifer, Herbert; Brawne, Nick; and Hsiao, Howell, to Sun Microsys-

tems. Twelve slot computer housing. 314,950, 2-26-91, Cl. D14-102.000.
Wada, Tatsumi: *See*—
Osaka, Kazumi; Hino, Shinsaku; and Wada, Tatsumi, 314,972, Cl. D18-13.000.
Walsh, Catherine. Chair. 314,870, 2-26-91, Cl. D6-358.000.
Wang, Jui-Shang, to Duracraft Corporation. Portable electrical fan. 315,018, 2-26-91, Cl. D23-382.000.
Ward, Larry M. Foot press. 315,002, 2-26-91, Cl. D21-191.000.
Warner-Lambert Company: *See*—
Puglisi, Salvatore A.; and Calayan, Carolina, 314,855, Cl. D1-127.000.
Wasik, Mark J.: *See*—
Lawassani, Abdi R.; and Wasik, Mark J., 314,936, Cl. D12-191.000.
Watanabe, Hiroaki, to Ricoh Company, Ltd. Facsimile transmitter/-receiver. 314,955, 2-26-91, Cl. D14-118.000.
Weber, Lynn: *See*—
Best, Melvin H. M.; Denninger, Valentine L.; Tang, John G.; Weber, Lynn; Janowski, Paul K.; and Stavros, Andrew, 314,963, Cl. D14-188.000.
Weightman, Judy M.; and Mirikitani, Andrew K. Shoulder belt cover or similar article. 314,859, 2-26-91, Cl. D2-639.000.
Welch, Robert A., to Compuadd Corporation. Large chassis computer bezel. 314,953, 2-26-91, Cl. D14-115.000.
Welch, Robert A., to Compuadd Corporation. Low profile computer bezel. 314,954, 2-26-91, Cl. D14-115.000.
Wenger Corporation: *See*—
Wenger, Kari J.; and Reshanov, Eugene N., 314,873, Cl. D6-419.000.
Wenger, Kari J.; and Reshanov, Eugene N., to Wenger Corporation. Collapsible music stand. 314,873, 2-26-91, Cl. D6-419.000.
Wondergem, Martin J.; and Cesaroni, William C., to Dart Industries Inc. Coffee maker. 314,881, 2-26-91, Cl. D7-309.000.
Wortham, Brent J. Housing for a multipurpose ultrasonic cleaner. 315,039, 2-26-91, Cl. D32-1.000.
Wyant, Jon R., to Mead Corporation, The. Folder. 314,977, 2-26-91, Cl. D19-27.000.
Yamamoto, Ei, to Canon Kabushiki Kaisha. Ink cartridge for printer. 314,973, 2-26-91, Cl. D18-22.000.
Yang, Doo S., to Gold Star Co., Ltd. Video cassette recorder. 314,960, 2-26-91, Cl. D14-135.000.
Young, Don D. Orifice tube expander. 314,899, 2-26-91, Cl. D8-59.000.
Yurkonis, Philip G.: *See*—
Vu, Tuan T.; Lee, Michael J.; Salimpour, Siamak; Yurkonis, Philip G.; Pfeifer, Herbert; Brawne, Nick; and Hsiao, Howell, 314,950, Cl. D14-102.000.
Zivin, Elliott N. Footed dessert cup. 314,886, 2-26-91, Cl. D7-558.000.
Zylka, Lawrence C.: *See*—
Cermak, Stephen, III; Hoeft, Manville A.; Zylka, Lawrence C.; Reshanov, Eugene N.; and Mueller, Eric J., 314,949, Cl. D14-102.000.
2500 Corporation, The: *See*—
Spica, Joseph P., 314,911, Cl. D8-373.000.

LIST OF PLANT PATENTEES

DeVor Nurseries, Inc.: *See*—
Marciel, Stanley G., 7,455, Cl. 18.000.
Fleming, Margaret M., to Plant Company, The. Kalanchoe plant named Vanguard. 7,458, 2-26-91, Cl. 68.000.
Hilverda b.v.: *See*—
Hilverda, Jan J., 7,459, Cl. 71.000.
Hilverda, Jan J., to Hilverda b.v. Carnation named Hilstefa. 7,459, 2-26-91, Cl. 71.000.
Hines Nurseries Inc.: *See*—
Mossholder, Rose M., 7,457, Cl. 56.000.
Klehm, Roy G.: *See*—
Savage, Philip G.; and Klehm, Roy G., 7,456, Cl. 51.000.
Klehm, Sarah L.: *See*—
Savage, Philip G.; and Klehm, Roy G., 7,456, Cl. 51.000.
Marciel, Stanley G., to DeVor Nurseries, Inc. Rose plant named Devloren. 7,455, 2-26-91, Cl. 18.000.
Mossholder, Rose M., to Hines Nurseries Inc. Azalea hybrid 'Jessica Dawn'. 7,457, 2-26-91, Cl. 56.000.
Plant Company, The: *See*—
Fleming, Margaret M., 7,458, Cl. 68.000.
Savage, Justine B.: *See*—
Savage, Philip G.; and Klehm, Roy G., 7,456, Cl. 51.000.
Savage, Philip G.; and Klehm, Roy G., to Savage, Justine B.; and Klehm, Sarah L. Magnolia tree named Butterflies. 7,456, 2-26-91, Cl. 51.000.
Williams, Michael C. Miniature rose plant named 'Michome'. 7,454, 2-26-91, Cl. 9.000.

CLASSIFICATION OF PATENTS

ISSUED FEBRUARY 26, 1991

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

15 4,995,114
69 4,995,115
104 4,995,116
150 4,995,118
163 4,995,119
410 4,995,117

CLASS 4

251 4,995,120
443 4,995,121
483 4,995,122
490 4,995,123

CLASS 5

247 4,995,125
421 4,995,126
450 4,995,124
461 4,995,127

CLASS 7

127 4,995,128

CLASS 8

115.6 4,995,884
527 4,995,885

CLASS 14

71.1 4,995,129
71.3 4,995,130

CLASS 15

22.1 4,995,131
104.33 4,995,132
151 4,995,134
229.001 4,995,133
250.21 4,995,135
312.1 4,995,136
327.1 4,995,137
340.1 4,995,138

CLASS 16

261 4,995,144
357 4,995,143

CLASS 19

80 R 4,995,142
148 4,995,141
159 A 4,995,140

CLASS 24

129 R 4,995,152

CLASS 26

69 R 4,995,151

CLASS 28

119 4,995,150

CLASS 29

25.35 4,995,149
26 A 4,995,148
116.1 4,995,147
281.3 4,995,146
407 4,995,145
527.1 4,995,163
564.2 4,995,162
568 4,995,160
4,995,161
596 4,995,159
623 4,995,886
723 4,995,158
740 4,995,157
838 4,995,156

CLASS 30

41 4,995,155
116 4,995,153
147 4,995,154
423 4,995,164

CLASS 33

265 4,995,166
361 4,995,165
404 4,995,167
529 4,995,168
534 4,995,169
551 4,995,170

CLASS 34

1 4,995,172
97 4,995,171

CLASS 36

29 4,995,173
72 R 4,995,174

CLASS 37

63 4,995,175
141 R 4,995,176

CLASS 38

88 4,995,177
102 4,995,178

CLASS 40

152.2 4,995,181
518 4,995,183
531 4,995,184
582 4,995,185
591 4,995,186
649 4,995,182

CLASS 42

50 4,995,179
70.07 4,995,180

CLASS 43

6 B1 4,685,239
8 4,995,187
23 4,995,188
42.31 4,995,189

CLASS 47

1.01 4,995,190
25 4,995,191
30 4,995,192

CLASS 48

197 R 4,995,193

CLASS 49

32 4,995,194
118 4,995,195
477 4,995,196

CLASS 51

7 Re.33,542
219 R 4,995,301
281 R 4,995,197
295 4,995,887
319 4,995,198
326 4,995,199
358 4,995,200
411 4,995,201
439 4,995,202

CLASS 52

6 4,995,203
126.1 4,995,204
189 4,995,205
200 4,995,208
210 4,995,207
238.1 4,995,209
297 4,995,206
391 4,995,210
582 4,995,211
646 4,995,212
656 4,995,213
657 4,995,214
747 4,995,215
770 4,995,605

CLASS 53

64 4,995,216
176 4,995,223
410 4,995,217
4,995,218
411 4,995,219
418 4,995,220
455 4,995,221
510 4,995,222
540 4,995,224
556 4,995,225

CLASS 54

49 4,995,226

CLASS 55

16 4,995,888
21 4,995,889
180 4,995,890
419 4,995,891

CLASS 56

249 4,995,227
255 4,995,228

CLASS 57

261 4,995,229
281 4,995,230

CLASS 60

203.1 4,995,231
243 4,995,232
324 4,995,233
648 4,995,234

CLASS 62

46.2 4,995,235
51.1 4,995,236
93 4,995,237
125 4,995,238
149 4,995,239
155 4,995,244
225 4,995,240
238.7 4,995,241
271 4,995,242
298 4,995,243
515 4,995,245

CLASS 65

12 4,995,892
18.2 4,995,893
19 4,995,894
60.2 4,995,895
250 4,995,896

CLASS 66

125 R 4,995,246

CLASS 68

12 R 4,995,247

CLASS 70

107 4,995,248
224 4,995,249
238 4,995,250

CLASS 71

64.11 4,995,897
90 4,995,898
92 4,995,899
4,995,900
93 4,995,901
94 4,995,902
121 4,995,903

CLASS 72

132 4,995,251
194 4,995,252
257 4,995,253
342.1 4,995,254
446 4,995,255

CLASS 73

31.04 4,995,256
38 4,995,271
116 4,995,139
4,995,257
118.2 4,995,258
593 4,995,259
632 4,995,260
702 4,995,263
4,995,264
4,995,265
706 4,995,266
767 4,995,261
800 4,995,267
842 4,995,262
861.05 4,995,268
861.22 4,995,269
863.85 4,995,270
865.6 4,995,272
4,995,273
865.8 4,995,274

CLASS 74

7 A 4,995,275
89.15 4,995,276
4,995,277
4,995,278
199 4,995,279
480 R 4,995,280
559 4,995,281
572 4,995,282
866 4,995,283
868 4,995,284
869 4,995,285

CLASS 75

244 4,995,905
445 4,995,904
502 4,995,906
561 4,995,907

CLASS 81

3.44 4,995,295
57.44 4,995,296
126 4,995,297
176.15 4,995,299

CLASS 82

12 4,995,300
101 4,995,286
127 4,995,298

CLASS 83

169 4,995,287
574 4,995,288
690 4,995,289

CLASS 84

160 4,995,290
237 4,995,291
726 4,995,292
733 4,995,293
738 4,995,294

CLASS 91

369.3 4,995,302

CLASS 92

5 R 4,995,303
92 4,995,304
138 4,995,305

CLASS 98

1 4,995,306
34.5 4,995,307
37 4,995,308
42.07 4,995,309

CLASS 99

295 4,995,310
4,995,311
411 4,995,312
467 4,995,313

CLASS 100

152 4,995,314

CLASS 101

96 4,995,315
123 4,995,316

CLASS 102

235 4,995,317
503 4,995,318

CLASS 104

112 4,995,319
118 4,995,320

CLASS 105

397 4,995,321

CLASS 106

38.22 4,995,908
277 4,995,909
287.32 4,995,910

CLASS 108

44 4,995,322
157 4,995,323

CLASS 110

234 4,995,324

CLASS 111

82 4,995,327
189 4,995,325

CLASS 112

453 4,995,328

CLASS 114

301 4,995,326
361 4,995,329

CLASS 116

175 4,995,330

CLASS 118

46 4,995,331
66 4,995,332
300 4,995,333
410 4,995,338
4,995,339
715 4,995,340
723 4,995,341

CLASS 119

5 4,995,334
15 4,995,336
18 4,995,337
4,995,342
53 4,995,343
85 4,995,344
98 4,995,335
160 4,995,345

CLASS 123

41.35 4,995,346
65 BA 4,995,347
65 V 4,995,354
65 VB 4,995,349
65 VC 4,995,350
65 VD 4,995,348
90.11 4,995,351
90.39 4,995,352
90.48 4,995,353
188 M 4,995,358
4,995,359
198 DB 4,995,355
198 DC 4,995,357
198 E 4,995,356
262 4,995,360
365 4,995,362
399 4,995,363
442 4,995,364
479 4,995,365
492 4,995,366
494 4,995,367
501 4,995,368
520 4,995,369
583 4,995,370

CLASS 124

7 4,995,371
25.5 4,995,372
25.6 4,995,373
54 4,995,374

CLASS 126

85 B 4,995,375
110 C 4,995,376
424 4,995,377

CLASS 127

48 4,995,911

CLASS 128

75 4,995,378
76 B 4,995,379
79 4,995,380
4,995,381
156 4,995,382
157 4,995,383
203.21 4,995,385
205.19 4,995,386
205.24 4,995,387
207.15 4,995,388
207.18 4,995,384
419 P 4,995,389
419 PG 4,995,390
635 4,995,391
639 4,995,392
648 4,995,393
653 A 4,995,394
653 R 4,995,395
654 4,995,396
661.09 4,995,397
668 4,995,398
680 4,995,399
725 4,995,400
748 4,995,401
771 4,995,402
776 4,995,403
777 4,995,404

CLASS 131

84.1 4,995,405
105 4,995,406
359 4,995,407

CLASS 132

320 4,995,408
324 4,995,361

CLASS 134

2 4,995,912
13 4,995,913
21 4,995,914
22.14 4,995,915
22.16 4,995,916
58 R 4,995,409
113 4,995,410
198 4,995,411

CLASS 135

67 4,995,412

CLASS 137

1 4,995,413
4,995,414
4,995,415
4,995,416
231 4,995,417
268 4,995,418
316 4,995,419
360 4,995,420
383 4,995,421
504 4,995,422
559 4,995,423
596 4,995,424
827 4,995,425

CLASS 138

39 4,995,426
155 4,995,427

CLASS 139

383 A 4,995,428
383 R 4,995,429

CLASS 141

98 4,995,430
116 4,995,431
130 4,995,432
312 4,995,433

CLASS 142

48 4,995,434

CLASS 144

363 4,995,435

CLASS 148

3 4,995,917
9 R 4,995,918
4,995,919
12.7 A 4,995,920
22 4,995,921
304 4,995,923
428 4,995,922
433 4,995,924

CLASS 149

2 4,995,925

CLASS 150

102 4,995,436

CLASS 152

209 R 4,995,437
518 4,995,438

CLASS 156

78 4,995,926
152 4,995,927
164 4,995,928
187 4,995,929
209 4,995,930
212 4,995,931
242 4,995,932
247 4,995,933
441.5 4,995,934
499 4,995,935
504 4,995,936
543 4,995,937
580.1 4,995,938
627 4,995,939
629 4,995,940
630 4,995,941
642 4,995,942

CLASS 157

1.17 4,995,439

CLASS 160

32 4,995,440
229.1 4,995,441
331 4,995,442

CLASS 162

63 4,995,943
199 4,995,944

CLASS 164

34 4,995,443
97 4,995,444
305 4,995,445
437 4,995,446

CLASS 165

44 4,995,447
4,995,448
76 4,995,449
104.21 4,995,450
104.33 4,995,451
119 4,995,452
150 4,995,453
155 4,995,454
166 4,995,455

CLASS 166

51 4,995,456
70 4,995,457
85 4,995,458
176 4,995,459
267 4,995,460
295 4,995,461
304 4,995,462
308 4,995,463
382 4,995,464

CLASS 174

255 4,996,391

CLASS 175

27 4,995,465
61 4,995,466

CLASS 177

25.18 4,995,467
139 4,995,468

CLASS 178

18 4,996,392
19 4,996,393

CLASS 180

89.13 4,995,469
197 4,995,470
219 4,995,471
234 4,995,472
716 4,995,636

CLASS 181

137 4,995,473

CLASS 182

187 4,995,475
201 4,995,474
206 4,995,476

CLASS 187

1 R 4,995,477
115 4,995,478
135 4,995,479

CLASS 188

1.11 4,995,480
70 R 4,995,481
73.1 4,995,482
162 4,995,483
218 R 4,995,484
322.17 4,995,485
374 4,995,486

CLASS 190

18 A 4,995,487

CLASS 192

1.1 4,995,488
45 4,995,489
4,995,490
58 B 4,995,494
58 R 4,995,491
85 CA 4,995,492
107 R 4,995,500
150 4,995,493

CLASS 193

32 4,995,499

CLASS 194

205 4,995,498
318 4,995,497
350 4,995,496

CLASS 196

46 4,995,495

CLASS 198

341 4,995,501
346.1 4,995,502
392 4,995,503
408 4,995,504
468.4 4,995,505
814 4,995,506

CLASS 200

5 E 4,996,394
61.58 B 4,996,395
81.9 M 4,996,396
144 B 4,996,397
148 A 4,996,398
4,996,399
345 4,996,400
527 4,996,401

CLASS 202

177 4,995,945

CLASS 203

99 4,995,946

CLASS 204

1.5 4,995,947
4,995,948
15 4,995,949
91 4,995,950
129 4,995,952
129.3 4,995,953
129.75 4,995,954
129.95 4,995,951
157.3 4,995,955
182.4 4,995,956
182.8 4,995,957
298.200 4,995,958
411 4,995,959
418 4,995,960

CLASS 206

39.7 4,995,507
44 B 4,995,508
209.1 4,995,509
315.6 4,995,510
362.1 4,995,511
396 4,995,512
446 4,995,513
574 4,995,514

CLASS 208

108 4,995,961
110 4,995,962
111 4,995,963
112 4,995,964

CLASS 209

166 4,995,965
240 4,995,966

CLASS 210

94 4,995,967
108 4,995,968
150 4,995,969
167 4,995,970
168 4,995,971
179 4,995,972
209 4,995,973
247 4,995,974
266 4,995,975
4,995,976
321.69 4,995,977
474 4,995,978
521 4,995,979
602 4,995,980
603 4,995,981
634 4,995,982
639 4,995,983
670 4,995,984
679 4,995,985
717 4,995,986
754 4,995,987
784 4,995,988
788 4,995,989
793 4,995,990
797 4,995,991
803 4,995,992

CLASS 211

65 4,995,515
87 4,995,516

CLASS 212

146 4,995,517
178 4,995,518

CLASS 215

32 4,995,519
220 4,995,520
249 4,995,521

CLASS 219

10.41 4,996,402
10.493 4,996,405
10.55 B 4,996,403
10.55 E 4,996,404
69.12 4,996,406
121.54 4,996,407
130.01 4,996,408
4,996,409
432 4,996,410

CLASS 220

1.5 4,995,522
4.12 4,995,523
23.83 4,995,524
85 R 4,995,525
94 R 4,995,526
266 4,995,527
404 B1 4,094,432
445 4,995,528
475 4,995,529

CLASS 221

46 4,995,530
75 4,995,531

CLASS 222

43 4,995,532
54 4,995,533
132 4,995,540
511 4,995,534
607 4,995,535

CLASS 223

102 4,995,536

CLASS 224

273 4,995,537
329 4,995,538

CLASS 225

2 4,995,539

CLASS 226

174 4,995,541

CLASS 227

112 4,995,542
113 4,995,543

CLASS 228

2 4,995,544
119 4,995,545
123 4,995,546
124 4,995,547
131 4,995,548
147 4,995,549
175 4,995,550
177 4,995,551
179 4,995,552

CLASS 229

125.29 4,995,557

CLASS 235

488 4,996,411

CLASS 236

48 R 4,995,553
51 4,995,554

CLASS 239

43 4,995,555
57 4,995,556
226 4,995,558
493 4,995,559
708 4,995,560

CLASS 241

62 4,995,561

CLASS 242

35.6 DE 4,995,562
59 4,995,563
67.10 R 4,995,564
71.8 4,995,565
77.2 4,995,566
107 4,995,567
125.1 4,995,568
130 4,995,569
193 4,995,570
249 4,995,571

CLASS 244

2 4,995,572
3.24 4,995,573
17.17 4,995,574
216 4,995,575

CLASS 248

145 4,995,576
205.3 4,995,577
210 4,995,578
284 4,995,579
421 4,995,580
480 4,995,581
544 4,995,582
636 4,995,583

CLASS 249

10 4,995,584

CLASS 250

201.9 4,996,412
208.1 4,996,413
211 R 4,996,438
213 VT 4,996,414
221 4,996,415
225 4,996,416
226 4,996,417
227.11 4,996,418
227.18 4,996,419
227.24 4,996,420
252.1 4,996,437
255 4,996,421
281 4,996,422
4,996,423
288 4,996,424
325 4,996,425
330 4,996,426
332 4,996,427
4,996,428
336.1 4,996,429
339 4,996,430
343 4,996,431
370.01 4,996,432
443.1 4,996,433
492.2 4,996,441
492.3 4,996,434
551 4,996,435
560 4,996,436
561 4,996,439
4,996,440

CLASS 251

30.03 4,995,585
30.04 4,995,586
129.06 4,995,587
144 4,995,588
335.3 4,995,589

CLASS 252

25 4,995,993
28 4,995,994
4,995,995
42.7 4,995,996
49.5 4,995,997
61 4,995,998
62.55 4,995,999
92 4,996,000
99 4,996,001
181.6 4,996,002
301.40 F 4,996,003
314 4,996,004
512 4,996,005
550 4,996,006

CLASS 256

24 4,995,590
34 4,995,591

CLASS 260

410.9 R 4,996,007

CLASS 261

111 4,996,008

CLASS 264

5 4,996,009
22 4,996,010
28 4,996,011
40.1 4,996,012
86 4,996,013
113 4,996,014
177.11 4,996,015
229 4,996,016

CLASS 266

44 4,995,592
227 4,995,593
272 4,995,594
275 4,995,595
281 4,995,596

CLASS 267

64.15 4,995,597
293 4,995,598

CLASS 269

32 4,995,599

CLASS 270

45 4,995,600

CLASS 271

127 4,995,601
207 4,995,602

CLASS 272

18 4,995,603
122 4,995,604

CLASS 273

1 GG 4,995,606
26 R 4,995,607
73 E 4,995,608
80.2 4,995,609
85 F 4,995,610
123 R 4,995,611
169 4,995,612
183 C 4,995,613
201 4,995,614
292 4,995,615
312 4,995,616
346 4,995,617
367 4,995,618
417 4,995,619

CLASS 277

25 4,995,620
37 4,995,621
80 4,995,622
208 4,995,623
235 B 4,995,624

CLASS 279

1 C 4,995,625

CLASS 280

231 4,995,626
261 4,995,627
304.1 4,995,628
414.1 4,995,629
602 4,995,630
607 4,995,631
615 4,995,632
618 Re.33,544
673 4,995,633
682 4,995,634
707 4,995,635
727 4,995,637
731 4,995,638
735 4,995,639
804 4,995,640

CLASS 283

67 4,995,641
105 4,995,642

CLASS 285

4 4,995,643
41 4,995,644
127 4,995,645
137.1 4,995,646
161 4,995,647
406 4,995,648

CLASS 292

175 4,995,649
201 4,995,650
4,995,651
202 4,995,652
216 4,995,653
4,995,654
251.5 4,995,655
307 R 4,995,656
327 4,995,657
336.3 4,995,658

CLASS 293

107 4,995,659
132 4,995,660

CLASS 294

1.4 4,995,661
64.1 4,995,662

CLASS 296

100 4,995,663
165 4,995,664
213 4,995,665
216 4,995,666
4,995,667

CLASS 297

248 4,995,668
379 4,995,669
423 4,995,670
439 4,995,671
483 4,995,672

CLASS 301

5 R 4,995,679
37 P 4,995,673
4,995,674
63 PW 4,995,675

CLASS 303

9.63 4,995,676
113 4,995,677

CLASS 305

58 R 4,995,678

CLASS 307

10.100 4,996,442
264 4,996,443
269 4,996,444
272.3 4,996,445
296.2 4,996,446
304 4,996,447
351 4,996,448
446 4,996,449
449 4,996,450
468 4,996,451
475 4,996,452
4,996,453
480 4,996,454

CLASS 310

12 4,996,455
261 4,996,456
268 4,996,457

CLASS 312

7.1 4,995,680
242 4,995,681
311 4,995,682
348.4 4,995,683

CLASS 313

402 4,996,458
467 4,996,459
586 4,996,460

CLASS 315

8 4,996,461
209 R 4,996,462
250 4,996,463
289 4,996,464
358 4,996,465

CLASS 318

6 4,996,466
480 4,996,467
587 4,996,468
757 4,996,469
772 4,996,470

CLASS 323

241 4,996,471

CLASS 324

71.6 4,996,472
72 4,996,473
78 D 4,996,474
96 4,996,475
158 F 4,996,476
158 MG 4,996,477
158 P 4,996,478
248 4,996,479
309 4,996,480
318 4,996,481
4,996,482
321 4,996,483
334 4,996,484
415 4,996,485
545 4,996,486
549 4,996,487
613 4,996,488
639 4,996,489
4,996,490
644 4,996,491
687 4,996,492
699 4,996,493

CLASS 328

65 4,996,494
4,996,495
228 4,996,496

CLASS 330

151 4,996,497
258 4,996,498
264 4,996,499
279 4,996,500
4,996,501

CLASS 331

46 4,996,502

CLASS 332

104 4,996,503

CLASS 333

81 R 4,996,504
218 4,996,505
219.1 4,996,506

CLASS 335

195 4,996,507
216 4,996,508

CLASS 337

232 4,996,509

CLASS 338

21 4,996,510
114 4,996,511
306 4,996,512

CLASS 340

310 R 4,996,513
426 4,996,514
4,996,515
443 4,996,516
506 4,996,517
518 4,996,518
653 4,996,519
662 4,996,520
691 4,996,521
700 4,996,522
781 4,996,523
825.02 4,996,524
825.31 4,996,525
825.44 4,996,526

CLASS 341

83 4,996,527
110 4,996,528
118 4,996,529
120 4,996,530
157 4,996,531

CLASS 342

81 4,996,532
108 4,996,533
195 4,996,534

CLASS 343

786 4,996,535

912 4,996,536

CLASS 346

1.1 4,996,537
74.3 4,996,538
76 PH 4,996,539
108 4,996,540
4,996,541
4,996,542

CLASS 350

1.6 4,995,684
3.65 4,995,685
96.10 4,995,688
96.14 4,995,689
96.15 4,995,686
4,995,690
4,995,691
96.16 4,995,692
96.18 4,995,693
96.19 4,995,694
96.2 4,995,687
4,995,696
96.20 4,995,695
96.21 4,995,728
96.29 4,995,697
4,995,698
96.32 4,995,699
266 4,995,700
276 R 4,995,701
331 R 4,995,702
333 4,995,703
334 4,995,704
350 S 4,995,705
4,995,706
427 4,995,707
4,995,708
447 4,995,709
480 4,995,710
529 4,995,711
603 4,995,712

CLASS 351

113 4,995,713
161 4,995,714
4,995,715
212 4,995,716
224 4,995,717

CLASS 353

31 4,995,718
122 4,995,719

CLASS 354

5 4,996,543
64 4,996,544
70 4,996,545
76 4,996,546
81 4,996,547
149.11 4,996,548
173.11 4,996,549
420 4,996,550
432 4,996,551

CLASS 355

1 4,996,552
27 4,996,553
4,996,554
44 4,996,555
50 4,996,556
4,996,557
4,996,558
56 4,996,559
91 4,996,560
202 4,996,561
205 4,996,562
212 4,996,563
235 4,996,564
245 4,996,565
246 4,996,566
290 4,996,567
308 4,996,568

CLASS 356

5 4,995,720
152 4,995,722
305 4,995,721
318 4,995,723
319 4,995,724
334 4,995,725
349 4,995,726
402 4,995,727

CLASS 357

14 4,996,569
22 4,996,570
23.5 4,996,571
4,996,572
23.7 4,996,574
4,996,575
23.700 4,996,573
29 4,996,576
30 4,996,577
4,996,578
4,996,579
34 4,996,580
4,996,581
69 4,996,582
70 4,996,583
71 4,996,584
74 4,996,585
4,996,586
4,996,587
80 4,996,588
82 4,996,589

CLASS 358

74 4,996,590
80 4,996,591
85 4,996,592
101 4,996,593
136 4,996,594
150 4,996,595
158 4,996,596
181 4,996,597
183 4,996,598
191.1 4,996,599
213.22 4,996,600
213.31 4,996,601
457 4,996,602
462 4,996,603
474 4,996,604
4,996,605
475 4,996,606

CLASS 360

18 4,996,607
51 4,996,608
57 4,996,609
61 4,996,610
72.3 4,996,611
96.5 4,996,612
99.08 4,996,613
103 4,996,614
104 4,996,615
4,996,616
4,996,623
105 4,996,617
106 4,996,618
109 4,996,619
121 4,996,620
126 4,996,621
135 4,996,622

CLASS 361

63 4,996,624
87 4,996,625
91 4,996,626
283 4,996,627
393 4,996,628
400 4,996,629
412 4,996,630
415 4,996,631

CLASS 362

32 4,996,632
35 4,996,633
82 4,996,634
267 4,996,635
431 4,996,636

CLASS 363

16 4,996,637
21 4,996,638

CLASS 364

200 4,996,639
4,996,640
4,996,641
419 4,996,642
424.03 4,996,643
431.05 4,996,644
449 4,996,645
483 4,996,646
484 4,996,647
513 4,996,648
518 4,996,649
519 4,996,650
520 4,996,651
521 4,996,652
4,996,653
4,996,654
550 4,996,655
558 4,996,656
559 4,996,657
571.04 4,996,658
579 4,996,659
748 4,996,660
4,996,661
900 4,996,662
4,996,663
4,996,664
4,996,665

CLASS 365

49 4,996,666
117 4,996,667
185 4,996,668
4,996,669
200 4,996,670
203 4,996,671
225.7 4,996,672

CLASS 366

2 4,995,729
273 4,995,730

CLASS 367

131 4,996,673
158 4,996,674
162 4,996,675

CLASS 368

73 4,996,676

CLASS 369

14 4,996,677
32 4,996,678
33 4,996,679
37 4,996,680
273 4,996,681
275.4 4,996,682

CLASS 370

4 4,996,683
58.1 4,996,685
100.1 4,996,684

CLASS 371

10.1 4,996,687
16.5 4,996,688
22.2 4,996,689
37.1 4,996,690
68.1 4,996,691

CLASS 372

26 4,996,692
66 4,996,693

CLASS 373

22 4,996,694

CLASS 374

43 4,995,731
139 4,995,732
140 4,995,733

CLASS 375

10 4,996,695
30 4,996,696
104 4,996,697
118 4,996,698

CLASS 376

116 4,996,017
203 4,996,018
272 4,996,019
313 4,996,020
446 4,996,021

CLASS 377

49 4,996,699
60 4,996,686

CLASS 378

145 4,996,700
146 4,996,701

CLASS 379

1 4,996,702
40 4,996,703
67 4,996,704
91 4,996,705
93 4,996,706
100 4,996,707
156 4,996,708
160 4,996,709
202 4,996,710

CLASS 380

30 4,996,711

CLASS 381

68.4 4,996,712
190 4,996,713

CLASS 382

3 4,996,714

CLASS 384

38 4,995,734
276 4,995,735
448 4,995,736
607 4,995,737

CLASS 400

7 4,995,738
63 4,995,739
4,995,740
120 4,995,741
124 4,995,742
4,995,743
157.2 4,995,744
605 4,995,745
616.2 4,995,746
625 4,995,747
691 4,995,748

CLASS 401

9 4,995,749
104 4,995,750
135 4,995,751

CLASS 402

34 4,995,752

CLASS 403

24 4,995,753
132 4,995,754
133 4,995,755

CLASS 404

6 4,995,756
26 4,995,757
88 4,995,758
119 4,995,760

CLASS 405

43 4,995,759
154 4,995,761
195 4,995,762
4,995,763
229 4,995,764

CLASS 406

117 4,995,765

CLASS 407

34 4,995,766
41 4,995,767

CLASS 408

239 A 4,995,768

CLASS 410

10 4,995,775
100 4,995,776

CLASS 411

361 4,995,777

CLASS 414

20 4,995,778
27 4,995,779
400 4,995,780
403 4,995,769
412 4,995,770
4,995,771
458 4,995,772
489 4,995,773
544 4,995,774
680 4,995,781
732 4,995,782
786 4,995,783
4,995,784
790.3 4,995,785

CLASS 415

148 4,995,786

CLASS 416

228 4,995,787
230 4,995,788

CLASS 417

360 4,995,789
4,995,790
366 4,995,791
4,995,792
403 4,995,793
431 4,995,794
571 4,995,795

CLASS 418

9 4,995,796
84 4,995,797

CLASS 419

2 4,996,022
12 4,996,023
40 4,996,024

CLASS 420

554 4,996,025

CLASS 422

106 4,996,026
113 4,996,027
147 4,996,028
188 4,996,029

CLASS 423

210 4,996,030
213.2 4,996,031
242 4,996,032
249 4,996,033
328 4,996,034
386 4,996,035
388 4,996,036
447.4 4,996,037
522 4,996,038
584 4,996,039

CLASS 424

3 4,996,040
9 4,996,041
54 4,996,042
61 4,996,043
64 4,996,044
70 4,996,045
71 4,996,059
78 4,996,046
79 4,996,047
80 4,996,048
93 4,996,049
94.2 4,996,050
195.1 4,996,051
404 4,996,052
410 4,996,053
422 4,996,054
442 4,996,055
443 4,996,056
451 4,996,057
462 4,996,058
473 4,996,060
475 4,996,061

CLASS 425

012 4,995,798
111 4,995,799
131.1 4,995,800
151 4,995,801
154 4,995,802
190 4,995,803
238 4,995,804

CLASS 426

8 4,996,062
21 4,996,063
46 4,996,064
72 4,996,065
77 4,996,066
96 4,996,067
234 4,996,068
248 4,996,069
330.5 4,996,070
415 4,996,071
417 4,996,072
487 4,996,073
601 4,996,074

CLASS 427

12 4,996,075
38 4,996,076
4,996,077
4,996,078
39 4,996,079
57 4,996,080
96 4,996,081
99 4,996,082
108 4,996,083
133 4,996,084
140 4,996,085
421 4,996,086

CLASS 428

11 4,996,087
40 4,996,088
64 4,996,089
71 4,996,090
113 4,996,091
157 4,996,092
212 4,996,093
4,996,094
215 4,996,095
216 4,996,096
220 4,996,097
229 4,996,098
245 4,996,099
259 4,996,100
272 4,996,101
285 4,996,102
304.4 4,996,109
305.5 4,996,103
323 4,996,104
336 4,996,105
343 4,996,106
4,996,110
400 4,996,107
411.1 4,996,108
432 4,996,111
447 4,996,112
469 4,996,119
600 4,996,113
610 4,996,114
614 4,996,115
627 4,996,116
633 4,996,117
639 4,996,118

CLASS 429

153 4,996,128
194 4,996,129

CLASS 430

2 4,996,120
17 4,996,122
20 4,996,123
59 4,996,124
66 4,996,125
87 4,996,121
106.6 4,996,126
109 4,996,127
264 4,996,130
276 4,996,131
286 4,996,132
4,996,134
309 4,996,135
313 4,996,133
378 4,996,136
522 4,996,137
558 4,996,138
569 4,996,139
583 4,996,140
4,996,141

CLASS 431

9 4,995,807
10 4,995,805
30 4,995,806

CLASS 432

72 4,995,808
118 4,995,809

CLASS 433

141 4,995,810
190 4,995,811
214 4,995,812

CLASS 434

96 4,995,813

CLASS 435

6 4,996,142
4,996,143
4,996,144
7.23 4,996,145
28 4,996,146
70.3 4,996,159
115 4,996,147
119 4,996,148
4,996,149
4,996,150
172.3 4,996,151
4,996,152
209 4,996,153
240.241 4,996,154
252.3 4,996,155
252.5 4,996,156
254 4,996,157
280 4,996,158

CLASS 436

2 4,996,160
132 4,996,161

CLASS 437

5 4,996,163
31 4,996,164
4,996,165
4,996,166
40 4,996,167
164 4,996,168
209 4,996,169
219 4,996,170

CLASS 439

61 4,995,814
63 4,995,815
71 4,995,816
4,995,817
74 4,995,818
79 4,995,819
157 4,995,820
4,995,821
161 4,995,822
226 4,995,823
290 4,995,824
328 4,995,825
347 4,995,826
405 4,995,827
4,995,828
409 4,995,829
4,995,830
557 4,995,831
578 4,995,832
596 4,995,833
620 4,995,834
668 4,995,835
675 4,995,836
863 4,995,837
874 4,995,838

CLASS 440

6 4,995,839
66 4,995,840

CLASS 441

11 4,995,841
22 4,995,842
74 4,995,843

CLASS 446

021 4,995,844
325 4,995,845
376 4,995,846

CLASS 450

71 4,995,847

CLASS 453

3 4,995,848

CLASS 455

33 4,996,715

CLASSIFICATION OF PATENTS

41	4,996,716
222	4,996,717
323	4,996,718
606	4,996,719
CLASS 464	
134	4,995,849
143	4,995,850
144	4,995,853
CLASS 474	
91	4,995,852
101	4,995,851
111	4,995,854
167	4,995,855
CLASS 475	
86	4,995,862
298	4,995,861
CLASS 493	
195	4,995,860
204	4,995,859
445	4,995,858
CLASS 501	
19	4,996,171
45	4,996,172
73	4,996,173
87	4,996,174
126	4,996,175
127	4,996,176
153	4,996,177
CLASS 502	
159	4,996,178
209	4,996,179
304	4,996,180
414	4,996,181
CLASS 503	
200	4,996,182
208	4,996,183
226	4,996,184
CLASS 505	
1	4,996,185
	4,996,186
	4,996,187
	4,996,188
	4,996,189
	4,996,190
	4,996,191
	4,996,192
CLASS 514	
11	4,996,193
21	4,996,194
23	4,996,195
53	4,996,196
54	4,996,197
157	4,996,198
167	4,996,199
185	4,996,200
212	4,996,201
213	4,996,202
231.5	4,996,203
248	4,996,204
250	4,996,205
258	4,996,206
	4,996,207
	4,996,208
263	4,996,209
278	4,996,210
289	4,996,211
293	4,996,212
300	4,996,213
311	4,996,214
316	4,996,215
338	4,996,216
	4,996,217
341	4,996,219
365	4,996,218
372	4,996,220
399	4,996,221
400	4,996,222
410	4,996,223
424	4,996,224
428	4,996,225
438	4,996,226
444	4,996,227
450	4,996,228
	4,996,229
454	4,996,230
467	4,996,231
474	4,996,232
560	4,996,233
563	4,996,234
649	4,996,235
659	4,996,236
720	4,996,237
865	4,996,238
873	4,996,239
CLASS 521	
78	4,996,240
107	4,996,241
131	4,996,242
CLASS 522	
99	4,996,243
CLASS 523	
136	4,996,244
	4,996,245
	4,996,246
	4,996,247
	4,996,248
144	4,996,249
500	4,996,250
CLASS 524	
17	4,996,251
88	4,996,252
91	4,996,253
104	4,996,254
112	4,996,256
261	4,996,255
262	4,996,257
274	4,996,258
276	4,996,259
381	4,996,260
CLASS 525	
131	4,996,261
177	4,996,262
178	4,996,263
179	4,996,264
242	4,996,265
271	4,996,266
423	4,996,267
434	4,996,268
444	4,996,269
531	4,996,270
537	4,996,271
CLASS 526	
62	4,996,272
177	4,996,273
208	4,996,274
245	4,996,275
927.5	4,996,276
CLASS 528	
15	4,996,277
	4,996,280
B1	4,742,142
26	4,996,278
27	4,996,279
73	4,996,281
75	4,996,282
80	4,996,283
92	4,996,284
117	4,996,285
123	4,996,286
125	4,996,287
220	4,996,288
226	Re.33,545
230	4,996,289
272	4,996,290
	4,996,291
328	4,996,292
352	4,996,293
421	4,996,294
CLASS 530	
221	4,996,295
350	4,996,296
395	4,996,297
	4,996,298
409	4,996,299
CLASS 534	
15	4,996,300
556	4,996,301
582	4,996,302
602	4,996,303
637	4,996,304
CLASS 536	
17.5	4,996,305
18.6	4,996,306
20	4,996,307
26	4,996,308
119	4,996,309
120	4,996,310
CLASS 540	
139	4,996,311
145	4,996,312
312	4,996,313
364	4,996,314
454	4,996,315
CLASS 544	
1	4,996,316
274	4,996,317
295	4,996,318
330	4,996,319
CLASS 546	
9	4,996,320
194	4,996,321
250	4,996,323
339	4,996,324
CLASS 548	
132	4,996,325
261	4,996,326
373	4,996,327
427	4,996,328
453	4,996,329
544	4,996,330
CLASS 549	
229	4,996,331
285	4,996,332
328	4,996,333
364	4,996,334
CLASS 552	
610	4,996,335
CLASS 556	
55	4,996,336
137	4,996,337
179	4,996,338
181	4,996,339
190	4,996,340
406	4,996,341
437	4,996,342
445	4,996,343
448	4,996,344
485	4,996,345
CLASS 558	
392	4,996,346
411	4,996,347
445	4,996,348
CLASS 560	
124	4,996,349
192	4,996,350
352	4,996,351
CLASS 562	
401	4,996,352
412	4,996,353
424	4,996,354
493	4,996,355
587	4,996,356
607	4,996,357
621	4,996,358
CLASS 564	
50	4,996,359
90	4,996,360
216	4,996,322
304	4,996,361
315	4,996,362
470	4,996,363
475	4,996,364
CLASS 568	
33	4,996,367
427	4,996,365
454	4,996,366
601	4,996,368
615	4,996,369
674	4,996,370
683	4,996,371
717	4,996,372
727	4,996,373
814	4,996,374
853	4,996,375
934	4,996,376
CLASS 570	
141	4,996,377
164	4,996,378
176	4,996,379
211	4,996,380
CLASS 585	
413	4,996,381
500	4,996,382
516	4,996,383
530	4,996,384
640	4,996,385
646	4,996,386
654	4,996,387
828	4,996,388
CLASS 600	
16	4,995,857
CLASS 604	
8	4,995,856
43	4,995,865
53	4,995,866
54	4,995,867
105	4,995,868
110	4,995,869
	4,995,870
	4,995,871
153	4,995,864
195	4,995,874
247	4,995,863
280	4,995,872
391	4,995,873
CLASS 606	
90	4,995,875
142	4,995,876
180	4,995,877
194	4,995,878
CLASS 623	
2	4,995,881
6	4,995,879
	4,995,880
8	4,995,882
23	4,995,883
CLASS 800	
200	4,996,389
220	4,996,390

CLASSIFICATION OF DESIGNS

D1—	101	314,853
	106	314,854
	127	314,855
D2—	215	314,856
	257	314,857
	314	314,858
	639	314,859
D3—	25	314,860
	35	314,861
	36	314,862
	37	314,863
	54	314,864
	56	314,865
	i00	314,866
D6—	324	314,867
	334	314,868
	335	314,869
	358	314,870
	368	314,871
	380	314,872
	419	314,873
	432	314,874
	449	314,875
	469	314,876
	479	314,877
	486	314,878
	597	314,879
D7—	300.2	314,880
	309	314,881
	334	314,882
	379	314,883
	545	314,884
	554	314,885
	558	314,886
	601	314,887
	605	314,888
	687	314,889
	693	314,890
	698	314,891
		314,892
D8—	14	314,893
		314,894
		314,895
	22	314,896
	50	314,897
	51	314,898
	59	314,899
	62	314,900
	89	314,901
	102	314,902
	310	314,903
	312	314,904
	334	314,908
	358	314,909
	359	314,910
	360	314,905
		314,906
	373	314,911
D9—	424	314,912
	430	314,913
	432	314,907
		314,914
	435	314,915
	448	314,916
		314,917
D10—	32	314,918
	46	314,919
	61	314,920
	62	314,921
	64	314,922
	70	314,923
	73	314,924
	78	314,925
		314,926
	126	314,927
	131	314,928
D11—	6	314,929
	96	314,930
D12—	114	314,932
	146	314,933
	155	314,934
	160	314,935
	191	314,936
		314,937
	217	314,938
D13—	119	314,940
	133	314,941
	147	314,942
		314,943
	158	314,939
	160	314,944
	179	314,945
D14—	100	314,946
		314,947
	102	314,948
		314,949
		314,950
	107	314,951
	113	314,952
	115	314,953
		314,954
	118	314,931
		314,955
		314,956
		314,957
	126	314,958
	135	314,959
		314,960
	157	314,961
	185	314,962
	188	314,963
	192	314,964
	241	314,965
	258	314,966
D16—	246	314,967
D17—	20	314,968
	22	314,969
D18—	4	314,970
	12	314,971
	13	314,972
	22	314,973
	23	314,974
	37	314,975
D19—	26	314,976
	27	314,977
	48	314,978
	51	314,979
	60	314,980
	75	314,981
	99	314,982
D20—	10	314,983
	22	314,984
D21—	11	314,985
	64	314,986
	89	314,987
	108	314,988
		314,989
		314,990
		314,991
		314,992
		314,993
		314,994
		314,995
	109	314,996
	134	314,997
		314,998
	150	314,999
	156	315,000
	189	315,001
	191	315,002
	197	315,003
	199	315,004
	219	315,005
	222	315,006
	232	315,007
	234	315,008
		315,009
	238	315,010
D22—	140	315,011
	147	315,012
D23—	209	315,013
	226	315,014
	229	315,015
	255	315,016
	301	315,017
	382	315,018
D24—	21	315,019
		315,020
	47	315,021
	63	315,022
D25—	17	315,023
	58	315,024
	67	315,025
	113	315,026
	124	315,027
D26—	24	315,028
	42	315,029
	63	315,030
	105	315,031
D27—	163	315,032
D28—	7	315,033
	10	315,034
	12	315,035
	41	315,036
D30—	122	315,037
	158	315,038
D32—	1	315,039
		315,040
	21	315,041
	22	315,042
	34	315,043
D34—	10	315,044
	32	315,046
D99—	30	315,045

CLASSIFICATION OF PLANTS

P.—	9	7,454
	18	7,455
	51	7,456
	56	7,457
	68	7,458
	71	7,459

GEOGRAPHICAL INDEX
OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

01 : 4,995,306
4,996,027
4,996,207
04 : 4,995,414
4,995,698
4,995,718
4,995,828
4,995,841
4,995,927
4,995,941
4,995,953
4,996,170
4,996,237
4,996,420
4,996,445
4,996,448
4,996,498
4,996,687
05 : 4,995,225
4,995,584
4,995,605
06 : 4,995,116
4,995,123
4,995,191
4,995,206
4,995,259
4,995,282
4,995,293
4,995,308
4,995,318
4,995,322
4,995,323
4,995,386
4,995,418
4,995,420
4,995,430
4,995,451
4,995,511
4,995,515
4,995,570
4,995,589
4,995,607
4,995,609
4,995,613
4,995,614
4,995,617
4,995,644
4,995,651
4,995,699
4,995,720
4,995,749
4,995,777
4,995,792
4,995,793
4,995,812
4,995,822
4,995,827
4,995,856
4,995,862
4,995,864
4,995,879
4,995,897
4,995,958
4,995,963
4,995,975
4,996,010
4,996,060
4,996,070
4,996,071
4,996,085
4,996,096
4,996,101
4,996,122
4,996,128
4,996,143
4,996,144
4,996,145
4,996,155
4,996,165
4,996,169
4,996,193
4,996,199
4,996,221
4,996,238
4,996,239
4,996,340
4,996,342
4,996,433
4,996,437
4,996,452
4,996,461
4,996,474
4,996,476
4,996,480
4,996,495
4,996,500
4,996,503
4,996,510
4,996,515
4,996,521
4,996,525
4,996,534
4,996,544
4,996,573
4,996,577
4,996,608
4,996,617
4,996,620
4,996,623
4,996,626
4,996,627
4,996,631
4,996,635
4,996,666
4,996,689
4,996,690
4,996,697
4,996,716
4,685,239
08 : 4,995,122
4,995,262
4,995,319
4,995,329
4,995,384
4,995,461
4,995,547
4,995,637
4,995,771
4,995,982
4,996,423
4,996,533
4,996,547
4,996,661
4,996,704
09 : 4,995,118
4,995,137
4,995,524
4,995,549
4,995,603
4,995,625
4,995,641
4,995,787
4,995,844
4,995,888
4,995,934
4,996,021
4,996,047
4,996,204
4,996,242
4,996,345
4,996,393
4,996,396
4,996,419
4,996,497
10 : 4,995,685
4,995,901
4,996,043
4,996,097
4,996,098
4,996,120
4,996,176
4,996,287
4,996,336
11 : 4,995,626
12 : 4,995,182
4,995,186
4,995,205
4,995,217
4,995,300
4,995,327
4,995,374
4,995,389
4,995,408
4,995,467
4,995,487
4,995,516
4,995,528
4,995,587
4,995,616
4,995,629
4,995,761
4,995,857
4,995,921
4,995,943
4,995,973
4,996,292
4,996,335
4,996,389
4,996,407
4,996,412
4,996,488
4,996,526
13 : 4,995,238
4,995,288
4,995,537
4,995,577
4,996,053
4,996,100
4,996,651
15 : 4,996,229
16 : 4,995,260
4,995,410
4,995,914
4,995,916
4,996,531
4,996,655
17 : Re.33,542
4,995,115
4,995,134
4,995,148
4,995,155
4,995,159
4,995,181
4,995,224
4,995,234
4,995,240
4,995,307
4,995,315
4,995,361
4,995,412
4,995,500
4,995,627
4,995,642
4,995,652
4,995,682
4,995,734
4,995,780
4,995,798
4,995,829
4,995,851
4,995,948
4,995,965
4,996,063
4,996,150
4,996,153
4,996,179
4,996,188
4,996,195
4,996,249
4,996,260
4,996,282
4,996,306
4,996,367
4,996,380
4,996,394
4,996,529
4,996,584
4,996,599
4,996,705
18 : 4,995,157
4,995,249
4,995,268
4,995,309
4,995,330
4,995,343
4,995,377
4,995,390
4,995,481
4,995,503
4,995,594
4,995,636
4,995,676
4,995,767
4,995,807
4,995,824
4,995,832
4,996,148
4,996,230
4,996,235
4,996,245
4,996,246
4,996,247
4,996,248
4,996,400
4,996,597
19 : 4,995,314
4,995,422
4,995,507
4,995,876
4,996,049
4,996,646
20 : 4,995,154
4,995,188
4,995,618
4,996,628
21 : 4,995,179
4,995,376
4,995,453
4,996,037
4,996,253
4,996,378
4,996,629
22 : 4,995,189
4,995,295
4,995,379
4,995,530
4,995,612
4,995,762
4,996,087
4,996,254
23 : 4,995,208
24 : 4,995,138
4,995,269
4,995,700
4,995,984
4,996,065
4,996,159
4,996,261
4,996,430
4,996,579
4,996,692
25 : 4,995,149
4,995,151
4,995,197
4,995,371
4,995,411
4,995,415
4,995,474

4,995,610
4,995,684
4,995,691
4,995,721
4,995,735
4,995,788
4,995,835
4,995,969
4,996,091
4,996,146
4,996,151
4,996,154
4,996,275
4,996,298
4,996,343
4,996,473
4,996,609
4,996,642
4,996,648
4,996,662
4,996,681
26 : 4,995,167
4,995,178
4,995,200
4,995,202
4,995,219
4,995,220
4,995,222
4,995,258
4,995,281
4,995,346
4,995,349
4,995,353
4,995,367
4,995,375
4,995,409
4,995,421
4,995,443
4,995,492
4,995,493
4,995,508
4,995,545
4,995,556
4,995,582
4,995,611
4,995,635
4,995,660
4,995,766
4,995,768
4,995,775
4,995,785
4,995,805
4,995,808
4,995,891
4,995,971
4,996,000
4,996,025
4,996,083
4,996,201
4,996,281
4,996,288
4,996,318
4,996,319
4,996,323
4,996,332
4,996,353
4,996,363
4,996,388
4,996,442
27 : 4,995,256
4,995,335
4,995,344
4,995,452
4,995,501
4,995,518
4,995,645
4,995,661
4,995,688
4,995,693
4,995,759
4,995,866
4,995,976

4,995,992
4,996,072
4,996,243
4,996,266
4,996,431
4,996,454
4,996,468
4,996,636
4,996,660
4,996,688
29 : 4,995,125
4,995,324
4,995,475
4,995,882
4,996,035
4,996,038
4,996,355
4,996,369
4,996,481
4,996,513
30 : 4,996,333
31 : 4,995,195
4,995,499
4,995,588
4,995,936
32 : 4,995,128
33 : 4,995,815
4,995,865
4,996,508
34 : Re.33,545
4,995,136
4,995,381
4,995,387
4,995,436
4,995,555
4,995,639
4,995,686
4,995,690
4,995,695
4,995,701
4,995,903
4,995,956
4,995,962
4,995,972
4,995,996
4,996,001
4,996,002
4,996,028
4,996,044
4,996,045
4,996,046
4,996,051
4,996,084
4,996,136
4,996,186
4,996,187
4,996,189
4,996,198
4,996,202
4,996,203
4,996,205
4,996,206
4,996,212
4,996,231
4,996,234
4,996,268
4,996,305
4,996,317
4,996,350
4,996,352
4,996,371
4,996,384
4,996,471
4,996,535
4,996,575
4,996,576
4,996,630
4,996,685
4,094,432
35 : 4,995,947
4,995,954
4,996,494

36 : 4,995,117
4,995,119
4,995,173
4,995,215
4,995,252
4,995,290
4,995,334
4,995,373
4,995,394
4,995,417
4,995,426
4,995,477
4,995,536
4,995,540
4,995,647
4,995,668
4,995,670
4,995,689
4,995,744
4,995,772
4,995,774
4,995,781
4,995,830
4,995,840
4,995,870
4,995,878
4,995,913
4,995,919
4,995,942
4,995,964
4,995,993
4,996,003
4,996,034
4,996,048
4,996,094
4,996,114
4,996,116
4,996,124
4,996,157
4,996,164
4,996,172
4,996,192
4,996,240
4,996,255
4,996,278
4,996,284
4,996,300
4,996,337
4,996,404
4,996,425
4,996,427
4,996,463
4,996,493
4,996,509
4,996,523
4,996,546
4,996,548
4,996,556
4,996,563
4,996,565
4,996,570
4,996,658
4,996,663
4,996,693
4,996,707
4,996,717
37 : 4,995,133
4,995,150
4,995,192
4,995,194
4,995,525
4,995,569
4,995,655
4,995,681
4,995,892
4,996,008
4,996,052
4,996,099
4,996,487
39 : 4,995,145
4,995,196
4,995,210

4,995,211
4,995,313
4,995,345
4,995,425
4,995,438
4,995,441
4,995,483
4,995,489
4,995,494
4,995,512
4,995,531
4,995,560
4,995,620
4,995,646
4,995,678
4,995,692
4,995,697
4,995,753
4,995,846
4,995,875
4,996,033
4,996,040
4,996,061
4,996,073
4,996,074
4,996,088
4,996,090
4,996,152
4,996,161
4,996,227
4,996,258
4,996,262
4,996,263
4,996,269
4,996,274
4,996,295
4,996,308
4,996,390
4,996,477
4,996,499
4,996,674
40 : 4,995,228
4,995,450
4,995,457
4,995,459
4,995,460
4,995,466
4,995,510
4,995,758
4,995,961
4,996,383
4,996,387
4,996,421
41 : 4,995,124
4,995,176
4,995,398
4,995,548
4,995,672
4,996,175
4,996,478
4,996,654
42 : 4,995,152
4,995,158
4,995,190
4,995,213
4,995,226
4,995,257
4,995,289
4,995,336
4,995,392
4,995,400
4,995,423
4,995,509
4,995,572
4,995,663
4,995,716
4,995,770
4,995,786
4,995,814
4,995,816
4,995,817
4,995,819

4,995,821
4,995,825
4,995,826
4,995,837
4,995,838
4,995,880
4,995,886
4,995,889
4,995,910
4,995,946
4,995,949
4,995,955
4,995,986
4,996,018
4,996,031
4,996,032
4,996,113
4,996,167
4,996,214
4,996,321
4,996,322
4,996,359
4,996,374
4,996,385
4,996,439
4,996,472
4,996,507
4,996,656
44 : 4,995,403
4,995,874
45 : 4,995,187
4,995,526
4,995,860
4,995,884
4,995,909
46 : 4,996,516
4,996,517
47 : 4,995,114
4,995,791
4,995,883
4,995,985
4,996,107
4,996,252
4,996,403
4,996,457
48 : 4,995,120
4,995,121
4,995,129
4,995,153
4,995,168
4,995,198
4,995,204
4,995,297
4,995,301
4,995,401
4,995,404
4,995,455
4,995,456
4,995,463
4,995,464
4,995,527
4,995,534
4,995,551
4,995,763
4,995,764
4,995,811
4,995,839
4,995,896
4,995,912
4,995,915
4,995,952
4,995,987
4,996,007
4,996,016
4,996,017
4,996,077
4,996,086
4,996,133
4,996,160
4,996,209
4,996,279
4,996,294

4,996,297
4,996,315
4,996,351
4,996,381
4,996,386
4,996,450
4,996,453
4,996,484
4,996,489
4,996,490
4,996,520
4,996,528
4,996,632
4,996,668
4,996,698
4,996,709
49 : 4,995,261
4,995,402
4,995,434
4,995,465
4,995,631
4,995,756
4,995,863
4,995,867
4,996,277
50 : 4,995,940
51 : Re.33,544
4,995,272
4,995,557
4,995,714
4,995,715
4,995,872
4,996,036
4,996,346
4,996,519
4,996,647
4,996,670
4,996,703
53 : 4,995,146
4,995,166
4,995,231
4,995,299
4,995,372
4,995,413
4,995,575
4,995,590
4,995,591
4,995,604
4,995,842
4,996,492
4,996,512
4,996,527
4,996,530
4,996,624
54 : 4,995,476
4,995,783
4,996,244
4,996,483
55 : 4,995,130
4,995,141
4,995,183
4,995,233
4,995,239
4,995,333
4,995,356
4,995,357
4,995,380
4,995,429
4,995,454
4,995,473
4,995,523
4,995,578
4,995,650
4,995,795
4,995,928
4,996,082
4,996,328
4,996,413
4,996,469
4,996,470
56 : 4,995,355

DESIGN PATENTS

01 : 314,924
04 : 314,874
315,005
315,006
315,036
05 : 314,901
06 : 314,880
314,890
314,898
314,916
314,926
314,929
314,950
314,963
314,974
314,976
314,979
314,981
314,982
315,004

315,012
315,016
315,033
315,039
09 : 314,883
314,886
314,934
315,013
11 : 315,035
12 : 314,866
314,987
315,021
13 : 314,876
15 : 314,859
16 : 314,895
314,913
315,010
17 : 314,868
314,878
314,887

314,900
314,938
314,944
315,002
315,008
315,015
18 : 314,920
314,997
315,023
20 : 315,032
21 : 315,038
24 : 314,882
26 : 314,894
314,903
314,911
314,936
314,966
315,044
27 : 314,930
315,030

29 : 314,864
33 : 314,945
34 : 314,855
314,862
314,863
314,915
314,917
315,045
36 : 314,870
314,877
314,884
314,904
314,914
314,919
314,927
314,939
314,951
314,952
314,962
314,983

314,984
315,001
315,025
315,040
37 : 315,031
39 : 314,867
314,873
314,977
315,041
40 : 314,893
314,909
41 : 314,858
42 : 314,871
314,879
314,905
314,922
314,925
45 : 314,853
47 : 314,940
48 : 314,869

314,885
314,896
314,899
314,910
314,932
314,946
314,953
314,954
315,037
50 : 315,009
51 : 314,875
314,921
314,937
53 : 314,854
314,860
315,028
55 : 314,881
314,948
314,949

PLANT PATENTS

06 : 7,455

7,457

7,458

17 : 7,456

45 : 7,454

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

SUBSCRIPTION ORDER FORM

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

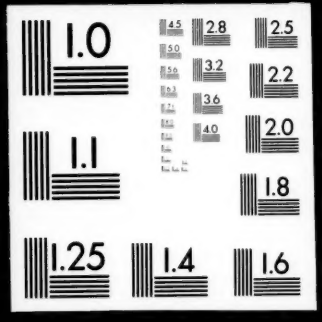
(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. .....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

U.S. DEPARTMENT OF COMMERCE
Robert A. Mosbacher, *Secretary*
PATENT AND TRADEMARK OFFICE
Harry F. Manbeck, Jr., *Commissioner*


1.0
1.1
1.25
1.4
1.6
2.8
2.5
3.2
2.2
3.6
2.0
4.0
1.8